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Department of  
Agriculture

Natural  
Resources  
Conservation  
Service

In cooperation with  
North Carolina  
Department of  
Environment, Health, and  
Natural Resources; North  
Carolina Agricultural  
Research Service; North  
Carolina Cooperative  
Extension Service;  
Granville Soil and Water  
Conservation District; and  
Granville County Board of  
Commissioners

# Soil Survey of Granville County, North Carolina







# How To Use This Soil Survey

## General Soil Map

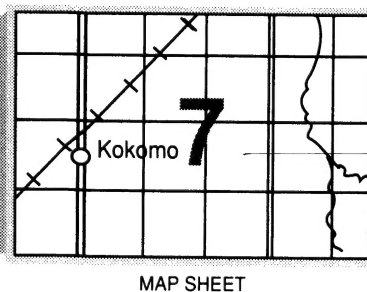
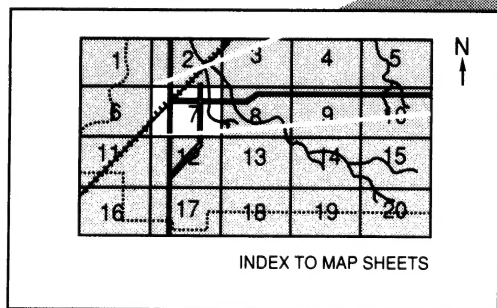
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

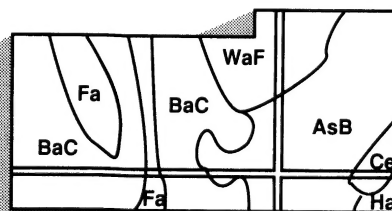
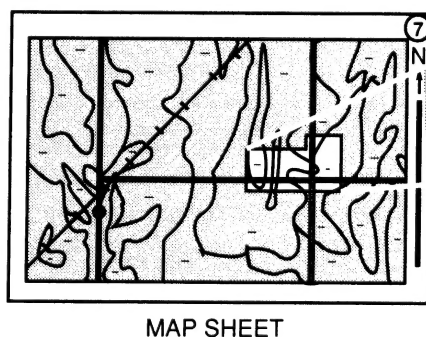
## Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.



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This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the North Carolina Agricultural Research Service, and local agencies. The Natural Resources Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1990. Soil names and descriptions were approved in 1992. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1992. This soil survey was made cooperatively by the Natural Resources Conservation Service; the North Carolina Department of Environment, Health, and Natural Resources; the North Carolina Agricultural Research Service; the North Carolina Cooperative Extension Service; the Granville Soil and Water Conservation District; and the Granville County Board of Commissioners. The survey is part of the technical assistance furnished to the Granville Soil and Water Conservation District. The Granville County Board of Commissioners provided financial assistance for the survey.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

The first soil survey of Granville County was published in 1912 by the U.S. Department of Agriculture. This survey updates the first survey, provides more detailed maps on aerial photographs, and contains more interpretive information (15).

All programs and services of the Natural Resources Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

**Cover: Fescue hayland in an area of Enon loam, 2 to 6 percent slopes. Pasture and hayland make up about one third of the farmland in Granville County.**



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Issued July 1997



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# Foreword

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This soil survey contains information that can be used in land-planning programs in Granville County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the North Carolina Cooperative Extension Service.

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State Conservationist  
Natural Resources Conservation Service





# Soil Survey of Granville County, North Carolina

By Betty F. McQuaid and Jon D. Vrana, Natural Resources Conservation Service

Soils surveyed by Jon D. Vrana, Deborah T. Anderson, Betty F. McQuaid, Sheryl Hallmark-Kunickis, and Philip J. Schoeneberger, Natural Resources Conservation Service, and Richard H. Brooks, Clare Dellwo Cole, and Jim A. Martin, North Carolina Department of Environment, Health, and Natural Resources

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with  
North Carolina Department of Environment, Health, and Natural Resources; North Carolina Agricultural Research Service; North Carolina Cooperative Extension Service; Granville Soil and Water Conservation District; and Granville County Board of Commissioners

GRANVILLE COUNTY is in the extreme north-central part of North Carolina (fig. 1). In 1990, the population of the county was 38,402 and the population of Oxford, the county seat, was 7,913. The total area of Granville County is about 343,744 acres, or 537 square miles.

## General Nature of the County

This section gives general facts about Granville County. It discusses history and development; physiography, relief, and drainage; water resources; mineral resources; transportation facilities and industry; and climate.

## History and Development

Granville County was established in 1746 by the North Carolina General Assembly. It was named in honor of John Carteret, Earl of Granville, who was the Lord Proprietor of the Granville District of North Carolina. Within 20 years after its establishment, Granville County had lost more than half of its territory to Orange County, Bute County (presently Warren and Franklin Counties), and Vance County.

In 1750, the first county court was held at Tabb's Creek on William Eaton's plantation. In 1764, the county court was moved to the estate of Samuel

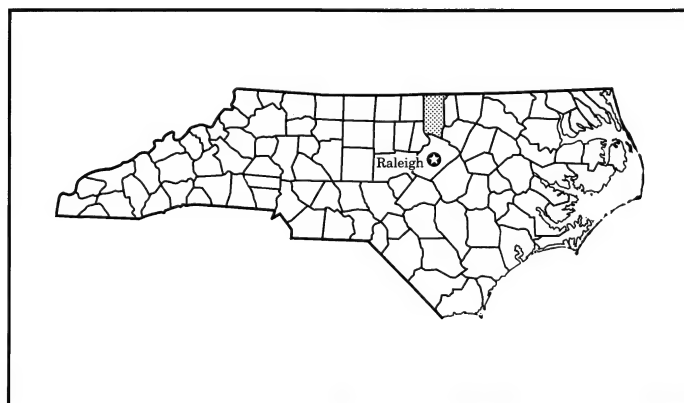


Figure 1.—Location of Granville County in North Carolina.

Benton. The name of the county seat was changed several times before it became Oxford in 1811. In 1816, the town of Oxford was incorporated.

As early as 1730, a few settlers were living in the vicinity of Kittrell and along Grassy Creek. They had drifted from surrounding areas. The greatest number of settlers came from Virginia during the 1740's and 1750's. The early settlers were mainly farmers. They grew tobacco, corn, small grains, and cotton and raised cattle, hogs, and sheep.

After the Civil War, Granville County began to grow and prosper. About this time, the railroad was constructed and Oxford became a center for the manufacture of buggies. In 1900, Oxford Cotton Mills was founded. In 1942, during World War II, the U.S. government set up a training base, Camp Butner, in the southern part of the county. The town of Creedmoor resulted from the location of Camp Butner and the new railway (13).

Agriculture still contributes substantially to the economy of the county. About 60,925 acres is cropland, and 40,478 acres is pasture. Tobacco is the chief cash crop. Other important crops are corn, soybeans, small grains, sorghum, and vegetables. Livestock production is also important. About 66 percent of the land area in Granville County, or about 225,371 acres, is used for forest-based industry. About 12,444 acres is urban or built-up land. Major water areas, those more than 40 acres in size, make up about 2,340 acres (21).

### **Physiography, Relief, and Drainage**

Granville County is in the Piedmont physiographic region. Most slopes are nearly level to strongly sloping. The steeper areas are dissected by drainageways or include large bodies of water.

Elevation ranges from 300 feet near Kerr Lake and at the southern edge of the county to 740 feet on Bowling's Mountain southwest of Oxford.

Most of the northern part of Granville County is drained by the Roanoke River and its tributaries, including Grassy Creek, Johnson Creek, Little Johnson Creek, and Mountain Creek. The southern part of the county is drained by tributaries of the Neuse River, including Beaverdam Creek, Robertson Creek, Smith Creek, Knapp of Reeds Creek, and Ledge Creek. The central part of the county is drained by the Tar River and Fishing Creek.

### **Water Resources**

Granville County has a plentiful supply of ground water for domestic and municipal use. The ground water is tapped through wells that have an average depth of 100 feet.

Water for livestock, irrigation, and recreational purposes is provided by more than 2,800 impounded ponds and by creeks and streams. Portions of Kerr Lake and Falls Lake also provide water for recreational purposes.

Oxford obtains its water supply from a regional water system that utilizes Kerr Lake. It also has a backup supply from Lake Devin, which has a storage capacity

of 412 million gallons. Creedmoor obtains its water supply from Lake Rogers, which has a storage capacity of 500 thousand gallons. Butner obtains its water supply from Lake Holt, which has a storage capacity of 2.2 billion gallons (9).

### **Mineral Resources**

The major mineral resources of Granville County include pyrophyllite, copper, and molydenite. Pyrophyllite is mainly used as a filler in ceramics and rubber products. Deposits of pyrophyllite occur on the crest and northeastern slope of Bowling's Mountain.

Copper was mined in northwestern Granville County in the early 1900's. Molydenite occurs in the fractures of an abandoned State highway quarry east of Wilton (7).

### **Transportation Facilities and Industry**

Transportation facilities in Granville County include one interstate highway, two U.S. highways, three State highways, and numerous State-maintained roads. Also, the county is served by a major railroad and a local airport, which is located 4 miles northeast of Oxford.

Products manufactured in the county include textiles, cosmetic products, china, wood products, plastic pipe, steel products, asphalt roofing, and telephone equipment. The industrial plants are mainly located in areas near Oxford, Creedmoor, and Butner. Tobacco research is conducted at the Oxford Tobacco Research Station through the joint efforts of the U.S. and N.C. Departments of Agriculture.

### **Climate**

Granville County is characterized by long, hot summers because moist tropical air from the Gulf of Mexico persistently covers the area. Winters are cool and fairly short. A cold wave occurs rarely and moderates in 1 or 2 days. Precipitation is fairly heavy throughout the year, and prolonged droughts are rare. Summer precipitation, mainly in the form of afternoon thunderstorms, is adequate for all crops.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Oxford, North Carolina, in the period 1951 to 1986. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 41 degrees F and the average daily minimum temperature is 31 degrees. The lowest temperature on record, which occurred at Oxford on January 21, 1985, is -8 degrees.

In summer, the average temperature is 76 degrees and the average daily maximum temperature is 88 degrees. The highest recorded temperature, which occurred at Oxford on July 29, 1952, is 105 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total average annual precipitation is about 44 inches. Of this, 24 inches, or about 50 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 20 inches. The heaviest 1-day rainfall during the period of record was 5.72 inches at Oxford on July 10, 1959. Thunderstorms occur on about 44 days each year.

The average seasonal snowfall is about 8 inches. The greatest snow depth at any one time during the period of record was 12 inches. On an average of 3 days, at least 1 inch of snow is on the ground.

The average relative humidity in midafternoon is about 55 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The sun shines 60 percent of the time possible in summer and 55 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 9 miles per hour, in spring.

Severe local storms, including tornadoes, strike occasionally in or near the county. They are short in duration and cause variable damage in spotty areas. Every few years in summer or autumn, a tropical depression or a remnant of a hurricane that has moved inland causes extremely heavy rainfall for 1 to 3 days.

## How This Survey Was Made

This survey was made to provide information about the soils in Granville County. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They studied many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil (figs. 2, 3, 4). It extends from the surface down into the unconsolidated material from which the soil formed. The unconsolidated material is devoid of roots

and other living organisms and has not been changed by other biological activity.

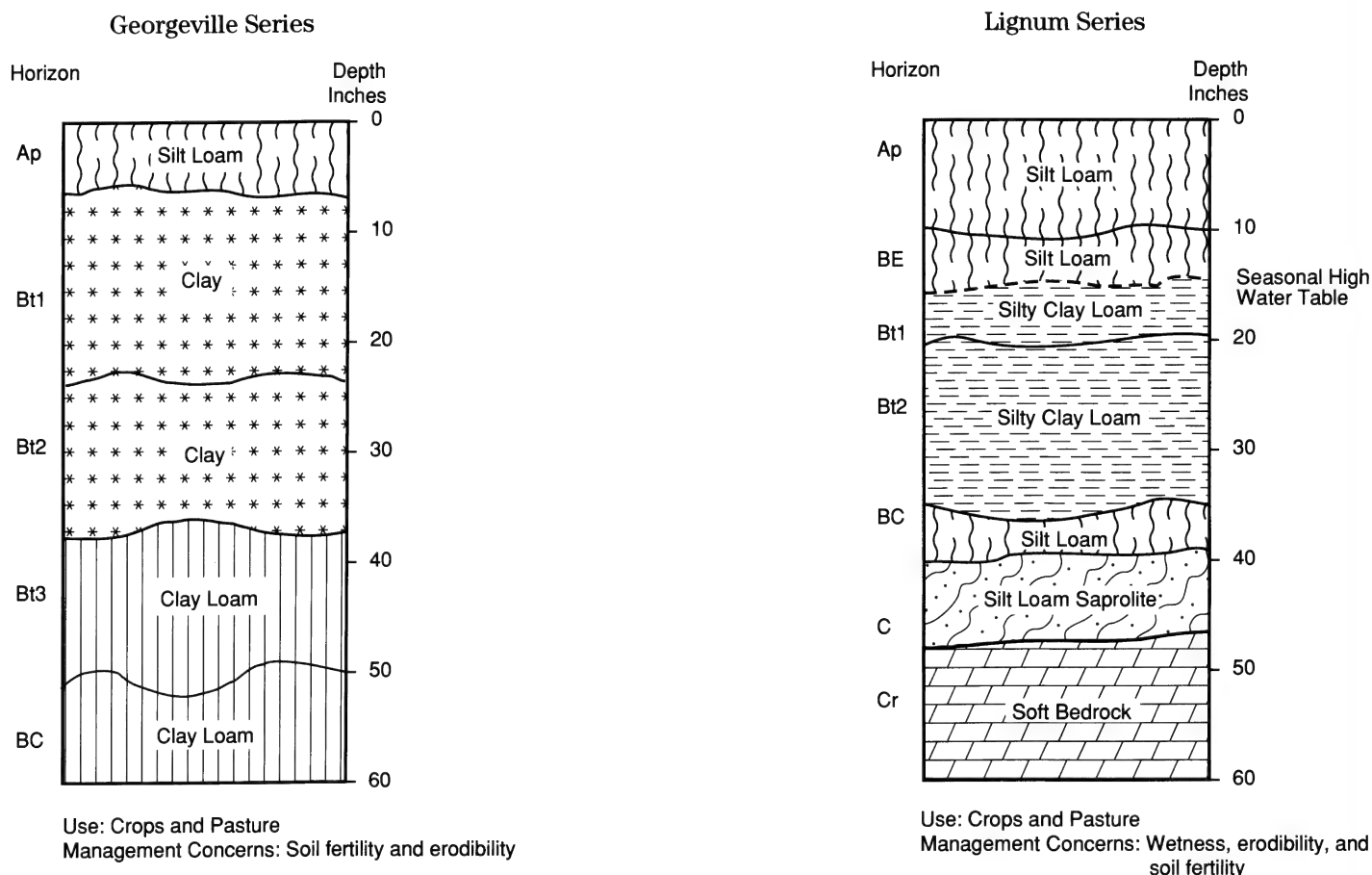
Soils occur in an orderly pattern that results from the combined influence over time of climate, parent material, relief, and plants and animals. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils and relating their position to specific segments of the landscape, soil scientists develop a concept, or model, of how the soils were formed. This model enables the soil scientists to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify the soils. After describing the soils and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area are generally collected for laboratory analyses and for engineering tests. The data from these analyses and tests and from field-observed characteristics and soil properties are used to predict behavior of the soils under different uses. Interpretations are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are





**Figure 2.—Soil profiles, selected uses, and limitations of contrasting soils in the Carolina Slate Belt.**

developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a relatively high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will be at a specific level in the soil on a specific date.

Soil boundaries are drawn on aerial photographs, and each delineation is identified as a specific map unit. Aerial photographs show trees, buildings, fields, roads,

and rivers, all of which help in accurately locating boundaries.

The general soil map unit lines and map unit names of Mecklenburg County, Virginia, and Granville County, North Carolina, do not have exact join. The soils in Granville County were separated into more detailed units. Major soil properties of the general soil map units for both counties, however, are similar and have comparable interpretations for broad land use considerations.

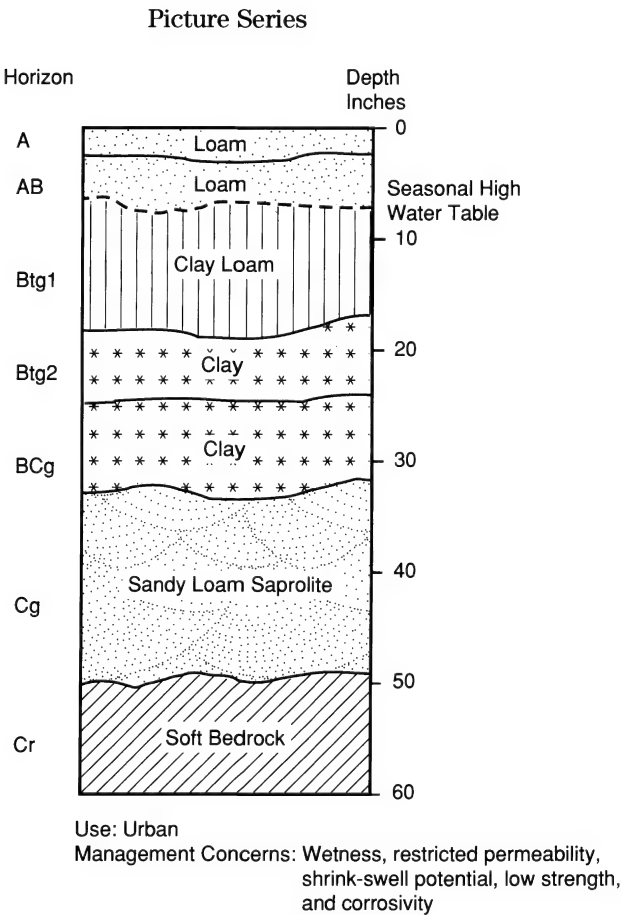
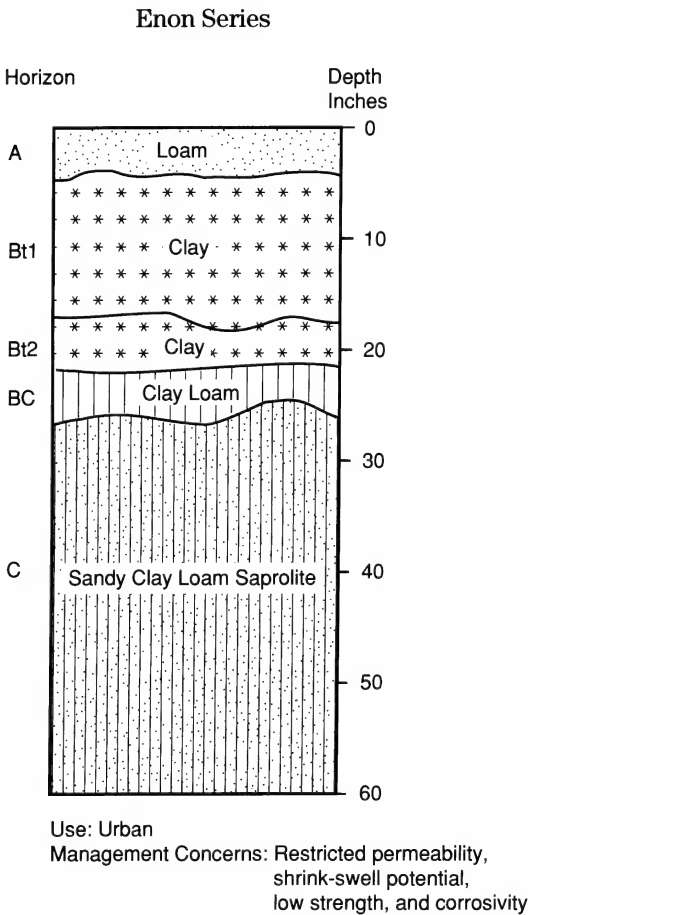
The Creedmoor general soil map unit in Granville County does not join the Chewacla-Wehadkee-Congaree general soil map unit in Durham County. Falls Lake was constructed after the publication of the soil survey of Durham County. The map unit that occupied the flood plain along the county line was eliminated.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soils. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes.

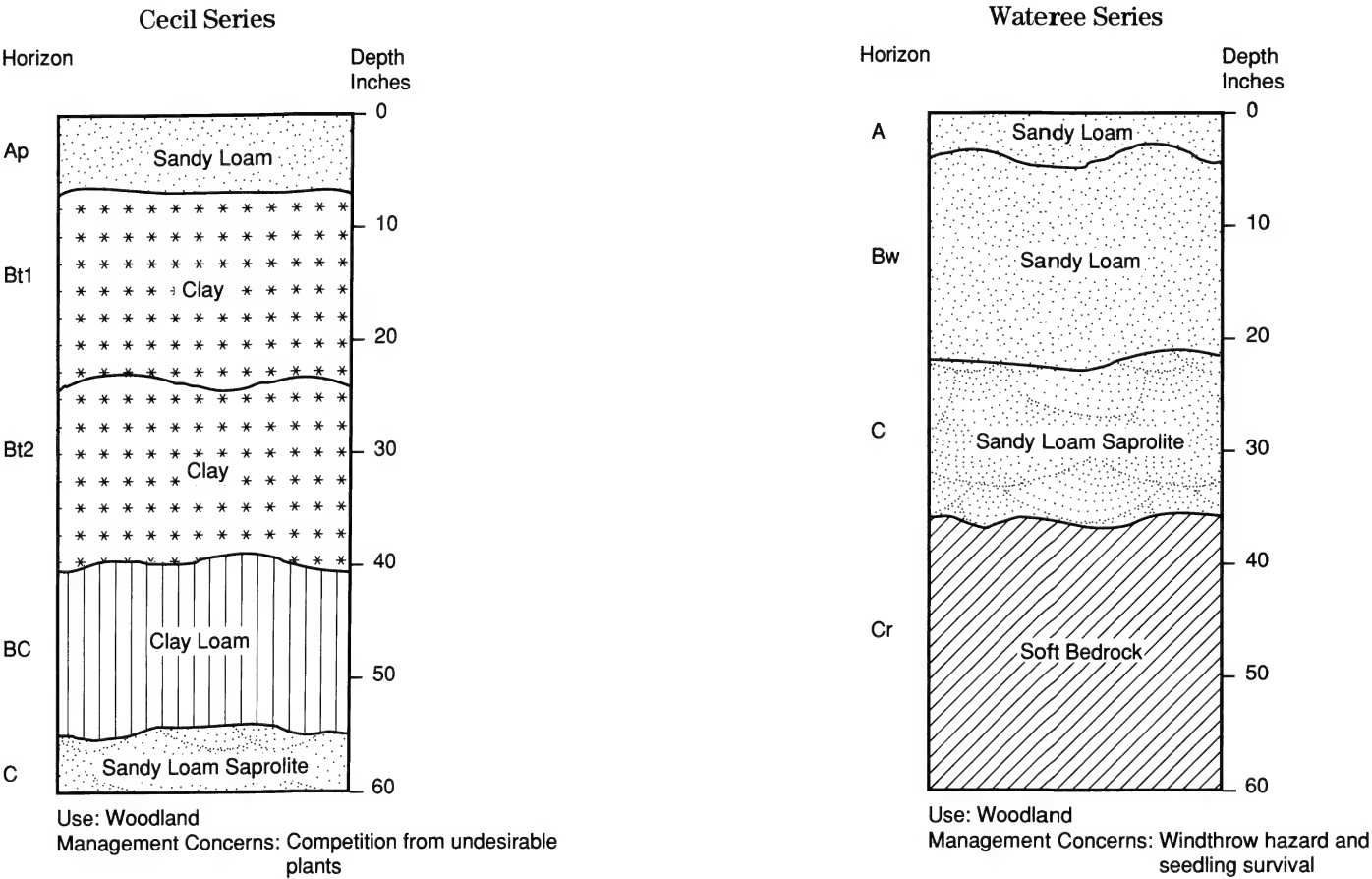
Consequently, every map unit is made up of the soils for which it is named and some soils that belong to other taxonomic classes. In the detailed soil map units, these latter soils are called inclusions or included soils. In the general soil map units, they are called minor soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps



Parent Rock System: Durham Triassic Basin

Figure 3.—Soil profiles, selected uses, and limitations of contrasting soils in the Durham Triassic Basin.





# General Soil Map Units

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The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or a building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

## 1. Cecil

*Gently sloping or moderately sloping, well drained soils that have a loamy surface layer and a clayey subsoil; on uplands*

### Setting

*Location in the county:* Southeastern and central parts

*Landscape:* Piedmont uplands

*Landform:* Broad to narrow ridges and narrow hill slopes

*Slope:* 2 to 10 percent

### Composition

*Percent of the county:* 15

Cecil soils—75 percent

Minor soils—25 percent

### Soil Characteristics

#### Cecil

*Surface layer:* Strong brown sandy loam

*Subsoil (upper part):* Red clay that has red and strong brown mottles

*Subsoil (lower part):* Red clay loam

*Underlying material:* Multicolored sandy loam saprolite in shades of red, yellow, and white

*Depth class:* Very deep

*Drainage class:* Well drained

*Depth to high water table:* More than 6 feet

*Slope:* 2 to 10 percent

*Parent material:* Residuum weathered from felsic intrusive rocks

#### Minor Soils

- Random areas of Pacolet soils that have a solum that is less than 40 inches thick
- Random areas of Appling soils that have a yellow subsoil
- The somewhat poorly drained Chewacla soils and poorly drained Wehadkee soils on flood plains
- Random areas of Wedowee soils that have a yellow subsoil and a solum that is 20 to 40 inches thick
- The moderately well drained Helena soils in depressions

### Use and Management

**Major uses:** Cropland, pasture and hayland, and woodland

#### Cropland

*Management concerns:* Erodibility and fertility

#### Pasture and hayland

*Management concerns:* Erodibility and fertility

#### Woodland

*Management concerns:* Competition from undesirable plants; equipment limitation and seedling survival in eroded areas

#### Urban development

*Management concerns:* Restricted permeability, low strength, corrosivity, and slope in the steeper areas

## 2. Nason-Herndon-Lignum

*Gently sloping to steep, well drained to somewhat poorly drained soils that have a loamy surface layer and a clayey subsoil; on uplands*

### Setting

*Location in the county:* Northern part

*Landscape:* Piedmont uplands

*Landform:* Nason—narrow ridges and hill slopes;

Herndon—broad ridges and hill slopes; Lignum—broad interstream divides, slight depressions, and head of drainageways

*Slope:* 2 to 50 percent

### **Composition**

*Percent of the county:* 13

Nason soils—40 percent

Herndon soils—20 percent

Lignum soils—15 percent

Minor soils—25 percent

### **Soil Characteristics**

#### **Nason**

*Surface layer:* Grayish brown gravelly loam

*Subsurface layer:* Yellowish brown loam

*Subsoil (upper part):* Strong brown clay loam and yellowish red clay

*Subsoil (lower part):* Strong brown silty clay loam

*Underlying material:* Multicolored silt loam saprolite in shades of red, brown, and white

*Bedrock:* Weathered, multicolored, fractured schist

*Depth class:* Deep

*Drainage class:* Well drained

*Depth to high water table:* More than 6 feet

*Slope:* 2 to 50 percent

*Parent material:* Residuum weathered from felsic volcanic rocks

#### **Herndon**

*Surface layer:* Brownish yellow silt loam

*Subsoil (upper part):* Brownish yellow clay loam that has red mottles

*Subsoil (middle part):* Brownish yellow clay loam that has red and very pale brown mottles

*Subsoil (lower part):* Brownish yellow silty clay loam that has red and very pale brown mottles

*Underlying material (upper part):* Mottled brownish yellow, red, and very pale brown silt loam saprolite

*Underlying material (lower part):* Multicolored silt loam saprolite in shades of red, yellow, and white

*Depth class:* Very deep

*Drainage class:* Well drained

*Depth to high water table:* More than 6 feet

*Slope:* 2 to 10 percent

*Parent material:* Residuum weathered from mixed felsic and mafic volcanic rocks

#### **Lignum**

*Surface layer:* Light yellowish brown silt loam

*Subsoil (upper part):* Light yellowish brown silt loam

*Subsoil (middle part):* Light yellowish brown silty clay loam that has strong brown and gray mottles over

brownish yellow silty clay loam that has yellowish brown mottles

*Subsoil (lower part):* Brownish yellow silt loam that has light gray and strong brown mottles

*Underlying material:* Multicolored silt loam saprolite in shades of brown, yellow, and gray

*Bedrock:* Weathered, multicolored, fractured schist

*Depth class:* Moderately deep

*Drainage class:* Moderately well drained and somewhat poorly drained

*Depth to high water table:* 1.0 to 2.5 feet from December through May

*Slope:* 2 to 6 percent

*Parent material:* Residuum weathered from felsic volcanic rocks

#### **Minor Soils**

- Random areas of the well drained Georgeville soils that have a red subsoil
- Random areas of the well drained Tatum soils that have a red subsoil and a solum that is 30 to 60 inches thick
- Random areas of the well drained Appling soils that have a yellow subsoil and that formed in felsic intrusive rocks

### **Use and Management**

**Major uses:** Woodland; small areas of cropland, pasture and hayland, or urban development

#### **Cropland**

*Management concerns:* Nason—erodibility, fertility, and equipment limitation in the steeper areas; Herndon—erodibility and fertility; Lignum—wetness, fertility, and erodibility

#### **Pasture and hayland**

*Management concerns:* Nason—equipment limitation in the steeper areas, fertility, and erodibility; Herndon—fertility and erodibility; Lignum—wetness, erodibility, and fertility

#### **Woodland**

*Management concerns:* Nason—competition from undesirable plants and equipment limitation, erodibility, and seedling survival in the steeper areas; Lignum—competition from undesirable plants and seedling mortality

#### **Urban development**

*Management concerns:* Nason—restricted permeability, depth to bedrock, low strength, corrosivity, and slope; Herndon—restricted permeability, low strength, corrosivity, and slope in the steeper areas; Lignum—wetness, restricted permeability, low strength, and corrosivity

### 3. Creedmoor

*Gently sloping or moderately sloping, moderately well drained or somewhat poorly drained soils that have a loamy surface layer and a clayey subsoil; on uplands*

#### Setting

*Location in the county:* Southwestern part

*Landscape:* Piedmont uplands

*Landform:* Broad ridges and hill slopes

*Slope:* 2 to 10 percent

#### Composition

*Percent of the county:* 18

Creedmoor soils—72 percent

Minor soils—28 percent

#### Soil Characteristics

##### Creedmoor

*Surface layer:* Brown coarse sandy loam

*Subsoil (upper part):* Mottled brownish yellow, red, and light gray clay

*Subsoil (middle part):* Mottled yellowish brown, light gray, and reddish yellow clay over mottled reddish yellow, light gray, and brown clay

*Subsoil (lower part):* Mottled gray, reddish yellow, and red silty clay loam

*Underlying material:* Mottled dark gray, light gray, and reddish yellow silty clay loam saprolite

*Depth class:* Very deep

*Drainage class:* Moderately well drained or somewhat poorly drained

*Depth to high water table:* 1.5 to 2.0 feet from January through March

*Slope:* 2 to 10 percent

*Parent material:* Residuum weathered from interbedded sedimentary rocks

##### Minor Soils

- The somewhat poorly drained Chewacla soils that have a loamy subsoil on flood plains
- The poorly drained Wehadkee soils that have a loamy subsoil on flood plains
- The well drained Mayodan soils on the slightly higher convex ridges
- The well drained Pinkston soils that have a loamy subsoil on hill slopes
- The moderately well drained Altavista soils that have a loamy subsoil on stream terraces
- Random areas of Udorthents that have various drainage classes and subsoil textures

#### Use and Management

**Major uses:** Cropland, pasture and hayland, woodland, and urban development

### Cropland

*Management concerns:* Erodibility, root penetration, fertility, and wetness

### Pasture and hayland

*Management concerns:* Wetness, fertility, and erodibility

### Woodland

*Management concerns:* Competition from undesirable plants

### Urban development

*Management concerns:* Wetness, restricted permeability, shrink-swell potential, low strength, corrosivity, and slope in the steeper areas

### 4. Iredell-Enon-Georgeville

*Gently sloping or moderately sloping, well drained to somewhat poorly drained soils that have a loamy surface layer and a clayey subsoil; on uplands*

#### Setting

*Location in the county:* Northern part

*Landscape:* Piedmont uplands

*Landform:* Iredell—broad interstream divides, head of drainageways, broad ridges, and hill slopes; Enon—convex knolls and ridges; Georgeville—broad ridges and broad to narrow hill slopes

*Slope:* 2 to 10 percent

#### Composition

*Percent of the county:* 7

Iredell soils—30 percent

Enon soils—27 percent

Georgeville soils—17 percent

Minor soils—26 percent

#### Soil Characteristics

##### Iredell

*Surface layer:* Dark grayish brown loam

*Subsoil (upper part):* Brown loam

*Subsoil (middle part):* Dark brown clay

*Subsoil (lower part):* Dark brown clay loam that has mottles in shades of yellow and brown

*Underlying material:* Mottled brownish yellow, strong brown, light brownish gray, and black loam saprolite

*Bedrock:* Weathered, multicolored, fractured diabase

*Depth class:* Deep

*Drainage class:* Moderately well drained

*Depth to high water table:* 2 to 3 feet from December through April

*Slope:* 2 to 10 percent

*Parent material:* Residuum weathered from mafic intrusive rocks

**Enon**

*Surface layer:* Dark brown loam

*Subsoil (upper part):* Dark yellowish brown clay

*Subsoil (middle part):* Yellowish brown clay

*Subsoil (lower part):* Yellowish brown clay loam that has mottles in shades of brown

*Underlying material:* Multicolored clay loam saprolite in shades of brown and yellow

*Depth class:* Very deep

*Drainage class:* Well drained

*Depth to high water table:* More than 6 feet

*Slope:* 2 to 10 percent

*Parent material:* Residuum weathered from mafic intrusive rocks

**Georgeville**

*Surface layer:* Strong brown silt loam

*Subsoil (upper part):* Red clay

*Subsoil (middle part):* Red clay that has mottles in shades of yellow

*Subsoil (lower part):* Red clay loam that has mottles in shades of yellow

*Underlying material:* Red silt loam saprolite

*Depth class:* Very deep

*Drainage class:* Well drained

*Depth to high water table:* More than 6 feet

*Slope:* 2 to 10 percent

*Parent material:* Residuum weathered from mixed felsic and mafic volcanic rocks

**Minor Soils**

- The well drained Cecil soils that have a red subsoil and that formed from felsic intrusive rocks
- The somewhat poorly drained Chewacla soils on flood plains
- The moderately well drained or somewhat poorly drained Lignum soils in depressions and at the head of drainageways that formed from felsic volcanic rocks
- The well drained Herndon soils that have a yellow subsoil and formed from mixed felsic and mafic volcanic rocks on ridges

**Use and Management**

**Major uses:** Cropland, pasture and hayland, and woodland

**Cropland**

*Management concerns:* Iredell—wetness, fertility, and erodibility; Enon—root penetration, erodibility, and fertility; Georgeville—erodibility and fertility

**Pasture and hayland**

*Management concerns:* Iredell—wetness, erodibility, and fertility; Enon and Georgeville—erodibility and fertility

**Woodland**

*Management concerns:* Iredell—equipment limitation, seedling mortality, and competition from undesirable plants; Enon—equipment limitation and competition from undesirable plants; Georgeville—equipment limitation

**Urban development**

*Management concerns:* Iredell—wetness, restricted permeability, low strength, shrink-swell potential, slope in the steeper areas, and corrosivity; Enon—restricted permeability, low strength, shrink-swell potential, slope in the steeper areas, and corrosivity; Georgeville—restricted permeability, low strength, slope in the steeper areas, and corrosivity

**5. Georgeville-Herndon**

*Gently sloping to strongly sloping, well drained soils that have a loamy surface layer and a clayey subsoil; on uplands*

**Setting**

*Location in the county:* Northern part

*Landscape:* Piedmont uplands

*Landform:* Georgeville—broad ridges and broad to narrow hill slopes; Herndon—broad ridges and hill slopes

*Slope:* 2 to 10 percent

**Composition**

*Percent of the county:* 21

Georgeville soils—56 percent

Herndon soils—17 percent

Minor soils—27 percent

**Soil Characteristics****Georgeville**

*Surface layer:* Strong brown silt loam

*Subsoil (upper part):* Red clay

*Subsoil (middle part):* Red clay that has mottles in shades of yellow

*Subsoil (lower part):* Red clay loam that has mottles in shades of yellow

*Underlying material:* Red silt loam saprolite that has mottles in shades of yellow

*Depth class:* Very deep

*Drainage class:* Well drained

*Depth to high water table:* More than 6 feet

*Slope:* 2 to 10 percent



*Parent material:* Residuum weathered from mixed felsic and mafic volcanic rocks

### **Herndon**

*Surface layer:* Brownish yellow silt loam

*Subsoil (upper part):* Brownish yellow clay loam that has mottles in shades of red

*Subsoil (middle part):* Brownish yellow clay loam that has mottles in shades of red and brown

*Subsoil (lower part):* Brownish yellow silty clay loam that has mottles in shades of red and brown

*Underlying material (upper part):* Mottled brownish yellow, red, and very pale brown silt loam saprolite

*Underlying material (lower part):* Multicolored silt loam saprolite in shades of red, yellow, and white

*Depth class:* Very deep

*Drainage class:* Well drained

*Depth to high water table:* More than 6 feet

*Slope:* 2 to 10 percent

*Parent material:* Residuum weathered from mixed felsic and mafic volcanic rocks

### **Minor Soils**

- The moderately well drained or somewhat poorly drained Lignum soils in depressions and at the head of drainageways
- The somewhat poorly drained Chewacla soils on flood plains
- Random areas of the well drained Nason soils that have a yellow subsoil and a solum that is less than 50 inches thick
- Random areas of the well drained Pacolet soils that have a red subsoil and a solum that is less than 40 inches thick
- Random areas of the well drained Tatum soils that have a red subsoil and a solum that is 30 to 60 inches thick

### **Use and Management**

**Major uses:** Cropland, pasture and hayland, and woodland

### **Cropland**

*Management concerns:* Erodibility and fertility

### **Pasture and hayland**

*Management concerns:* Erodibility and fertility

### **Woodland**

*Management concerns:* Equipment limitation

### **Urban development**

*Management concerns:* Restricted permeability, low strength, corrosivity, and slope in the steeper areas

## **6. Vance-Helena**

*Gently sloping or moderately sloping, well drained or moderately well drained soils that have a loamy surface layer and a clayey subsoil; on uplands*

### **Setting**

*Location in the county:* Central part

*Landscape:* Piedmont uplands

*Landform:* Vance—convex knolls and ridges and narrow hill slopes; Helena—interstream divides, head of drainageways, depressions, and the lower hill slopes

*Slope:* 2 to 10 percent

### **Composition**

*Percent of the county:* 21

Vance soils—34 percent

Helena soils—25 percent

Minor soils—41 percent

### **Soil Characteristics**

#### **Vance**

*Surface layer:* Yellowish brown sandy loam

*Subsoil (upper part):* Brownish yellow clay that has mottles in shades of red

*Subsoil (middle part):* Brownish yellow clay that has mottles in shades of red, yellow, and brown

*Subsoil (lower part):* Brownish yellow clay loam that has mottles in shades of red, yellow, and white

*Underlying material:* Multicolored sandy clay loam saprolite in shades of red, brown, yellow, and white

*Depth class:* Very deep

*Drainage class:* Well drained

*Depth to high water table:* More than 6 feet

*Slope:* 2 to 10 percent

*Parent material:* Residuum weathered from felsic intrusive rocks

#### **Helena**

*Surface layer:* Grayish brown sandy loam

*Subsurface layer:* Light yellowish brown sandy loam

*Subsoil (upper part):* Brownish yellow sandy clay loam that has mottles in shades of brown

*Subsoil (middle part):* Yellowish brown clay that has mottles in shades of brown and gray over strong brown clay that has mottles in shades of gray

*Subsoil (lower part):* Mottled light gray, brownish yellow, and strong brown clay loam

*Underlying material (upper part):* Strong brown sandy loam saprolite that has mottles in shades of gray

*Underlying material (lower part):* Mottled strong brown, light gray, and yellow sandy loam saprolite

*Depth class:* Very deep  
*Drainage class:* Moderately well drained  
*Depth to high water table:* 1.5 to 2.5 feet from January through April  
*Slope:* 2 to 10 percent  
*Parent material:* Residuum weathered from felsic intrusive rocks

#### **Minor Soils**

- The well drained Enon soils on convex ridgetops and knolls
- The well drained Appling soils that have a yellow, moderately permeable subsoil
- The somewhat poorly drained Chewacla soils and poorly drained Wehadkee soils on flood plains
- The well drained Cecil and Georgeville soils that have a red, moderately permeable subsoil

#### **Use and Management**

**Major uses:** Cropland, pasture and hayland, and woodland

#### **Cropland**

*Management concerns:* Vance—fertility, root penetration, and erodibility; Helena—wetness, fertility, and erodibility

#### **Pasture and hayland**

*Management concerns:* Vance—fertility and erodibility; Helena—wetness, fertility, and erodibility

#### **Woodland**

*Management concerns:* Vance—competition from undesirable plants and equipment limitation; Helena—competition from undesirable plants

#### **Urban development**

*Management concerns:* Vance—restricted permeability, shrink-swell potential, low strength, corrosivity, and slope in the steeper areas; Helena—wetness, restricted permeability, shrink-swell potential, low strength, corrosivity, and slope in the steeper areas

## **7. Iredell-Picture-Enon**

*Nearly level to moderately sloping, poorly drained to well drained soils that have a loamy surface layer and a clayey subsoil; on uplands*

#### **Setting**

*Location in the county:* Southwestern part

*Landscape:* Piedmont uplands

*Landform:* Iredell—interstream divides, head of drainageways, and hill slopes; Picture—broad

upland flats and interstream divides; Enon—knolls, ridges, and hill slopes  
*Slope:* 0 to 10 percent

#### **Composition**

*Percent of the county:* 4  
 Iredell soils—37 percent  
 Picture soils—26 percent  
 Enon soils—20 percent  
 Minor soils—17 percent

#### **Soil Characteristics**

##### **Iredell**

*Surface layer:* Dark grayish brown loam  
*Subsoil (upper part):* Brown loam  
*Subsoil (middle part):* Dark brown clay  
*Subsoil (lower part):* Dark brown clay loam that has mottles in shades of yellow and brown  
*Underlying material:* mottled brownish yellow, strong brown, light brownish gray, and black loam saprolite  
*Bedrock:* weathered, multicolored, fractured diabase  
*Depth class:* Deep  
*Drainage class:* Moderately well drained  
*Depth to high water table:* 2 to 3 feet from December through April  
*Slope:* 2 to 10 percent  
*Parent material:* Residuum weathered from mafic intrusive bedrock

##### **Picture**

*Surface layer (upper part):* Very dark gray loam  
*Surface layer (lower part):* Very dark grayish brown loam  
*Subsoil (upper part):* Very dark grayish brown clay loam  
*Subsoil (middle part):* Dark grayish brown clay  
*Subsoil (lower part):* Mottled dark grayish brown, light olive brown, and strong brown clay  
*Underlying material:* Mottled dark grayish brown, light olive brown, and strong brown sandy loam  
*Bedrock:* Weathered, multicolored diabase  
*Depth class:* Deep  
*Drainage class:* Poorly drained  
*Depth to high water table:* 0.5 foot to 1.5 feet from November through April  
*Slope:* 0 to 3 percent  
*Parent material:* Residuum weathered from mafic intrusive rocks

##### **Enon**

*Surface layer:* Dark brown loam  
*Subsoil (upper part):* Dark yellowish brown clay  
*Subsoil (middle part):* Yellowish brown clay  
*Subsoil (lower part):* Yellowish brown clay loam that has mottles in shades of brown  
*Underlying material:* Multicolored clay loam saprolite in shades of brown and yellow

*Depth class:* Very deep

*Drainage class:* Well drained

*Depth to high water table:* More than 6 feet

*Slope:* 2 to 10 percent

*Parent material:* Residuum weathered from mafic intrusive rocks

#### **Minor Soils**

- Random areas of urban land
- Random areas of the moderately well drained Creedmoor soils that formed from sedimentary rocks
- The somewhat poorly drained Chewacla soils and poorly drained Wehadkee soils on flood plains

#### **Use and Management**

**Major uses:** Woodland and urban development; small areas of pasture and hayland or cropland

#### **Cropland**

*Management concerns:* Iredell—wetness, erodibility, and fertility; Picture—wetness and overland flow; Enon—root penetration, erodibility, and fertility

#### **Pasture and hayland**

*Management concerns:* Iredell—wetness, erodibility, and fertility; Picture—wetness and overland flow; Enon—erodibility and fertility

#### **Woodland**

*Management concerns:* Iredell and Picture—equipment limitation, seedling survival, and competition from undesirable plants; Enon—equipment limitation

#### **Urban development**

*Management concerns:* Iredell—wetness, restricted permeability, low strength, shrink-swell potential, corrosivity, and slope in the steeper areas; Picture—wetness, restricted permeability, brief periods of overland flow, low strength, shrink-swell potential, and corrosivity; Enon—restricted permeability, low strength, shrink-swell potential, corrosivity, and slope in the steeper areas

## **8. Wedowee-Rion-Wateree**

*Gently sloping or moderately steep, well drained soils that have a loamy surface layer and a loamy or clayey subsoil; on uplands*

#### **Setting**

*Location in the county:* Southeastern part

*Landscape:* Piedmont uplands

*Landform:* Wedowee—broad ridges and broad to narrow hill slopes; Rion—hill slopes; Wateree—the lower hill slopes

*Slope:* 2 to 30 percent

#### **Composition**

*Percent of the county:* 1

Wedowee soils—50 percent

Rion soils—25 percent

Wateree soils—13 percent

Minor soils—12 percent

#### **Soil Characteristics**

##### **Wedowee**

*Surface layer:* Dark grayish brown sandy loam

*Subsurface layer:* Brownish yellow coarse sandy loam

*Subsoil (upper part):* Strong brown clay that has mottles in shades of red and brown

*Subsoil (lower part):* Strong brown clay loam that has mottles in shades of red and yellow

*Underlying material:* Multicolored sandy clay loam saprolite in shades of red, yellow, and white

*Depth class:* Deep

*Drainage class:* Well drained

*Depth to high water table:* More than 6 feet

*Slope:* 2 to 30 percent

*Parent material:* Residuum weathered from felsic intrusive rocks

##### **Rion**

*Surface layer (upper part):* Very dark grayish brown sandy loam

*Surface layer (lower part):* Brown sandy loam

*Subsurface layer:* Brownish yellow sandy loam

*Subsoil (upper part):* Yellowish brown clay loam

*Subsoil (lower part):* Yellowish brown sandy clay loam that has streaks in shades of black, white, and yellow

*Underlying material:* Multicolored sandy clay loam saprolite in shades of red, yellow, and white

*Depth class:* Very deep

*Drainage class:* Well drained

*Depth to high water table:* More than 6 feet

*Slope:* 8 to 30 percent

*Parent material:* Residuum weathered from felsic intrusive rocks

##### **Wateree**

*Surface layer:* Brown sandy loam

*Subsoil:* Yellowish brown sandy loam

*Underlying material:* Very pale brown coarse sandy loam saprolite

*Bedrock:* Weathered, multicolored granite

*Depth class:* Moderately deep

*Drainage class:* Well drained

*Depth to high water table:* More than 6 feet

*Slope:* 8 to 30 percent

*Parent material:* Residuum weathered from felsic intrusive rocks

### Minor Soils

- The somewhat poorly drained Chewacla soils on flood plains
- The poorly drained Wehadkee soils on flood plains
- The well drained Vance soils that have a firm clayey subsoil on convex knolls

### ***Use and Management***

**Major uses:** Woodland; small areas of cropland or pasture and hayland

### **Cropland**

*Management concerns:* Wedowee and Rion—erodibility, fertility, and equipment limitation; Wateree—erodibility, fertility, rooting depth, and equipment limitation

### **Pasture and hayland**

*Management concerns:* Wedowee and Rion—erodibility, fertility, and equipment limitation; Wateree—erodibility, fertility, equipment limitation, and rooting depth

### **Woodland**

*Management concerns:* Rion and Wedowee—erodibility, equipment limitation, and competition from undesirable plants; Wateree—erodibility, equipment limitation, seedling survival, and windthrow hazard

### **Urban development**

*Management concerns:* Wedowee—restricted permeability, shrink-swell potential, low strength, corrosivity, and slope in the steeper areas; Rion—slope and corrosivity; Wateree—slope, depth to bedrock, and corrosivity



## Detailed Soil Map Units

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The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of the dominant soils within the map unit for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit is given under the heading "Use and Management of the Soils."

The map units on the detailed soil maps represent areas on the landscape and consist mainly of the dominant soils for which the units are named.

Symbols identifying the soils precede the map unit names in the map unit descriptions. The descriptions include general facts about the soils and give the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are named as phases of soil series. The name of a soil phase commonly indicates a feature or features that affect use or management. For example, Appling sandy loam, 2 to 6 percent slopes, is a map unit of the Appling series that identifies surface texture and slope group as the dominant soil features affecting use or management.

Some map units are made up of two or more major soils. These map units are called soil complexes or undifferentiated groups.

A *soil complex* consists of two or more contrasting soils, or miscellaneous land areas, in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas.

Appling-Urban land complex, 2 to 10 percent slopes, is an example.

An *undifferentiated group* is made up of two or more dominant soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Chewacla and Wehadkee soils, 0 to 2 percent slopes, frequently flooded, is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils may be identified by a special symbol on the soil maps. These areas are generally less than 1 acre in size.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Urban land in areas of Urban land-Iredell-Creedmoor complex, 2 to 10 percent slopes, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and suitabilities for many uses. The Glossary defines many of the terms used in describing the soils.

### **AaA—Altavista loam, 0 to 3 percent slopes, rarely flooded**

#### ***Setting***

*Landscape:* Piedmont drainageways

*Landform:* Low stream terraces

*Shape of areas:* Rounded to long and narrow or irregularly shaped

*Size of areas:* 10 to 200 acres

### **Composition**

Altavista soil and similar inclusions: 85 percent

Dissimilar inclusions: 15 percent

### **Typical Profile**

*Surface layer:*

0 to 8 inches—grayish brown loam

*Subsurface layer:*

8 to 20 inches—brown sandy loam

*Subsoil:*

20 to 24 inches—light yellowish brown sandy clay loam

24 to 30 inches—light yellowish brown sandy clay loam

30 to 44 inches—light yellowish brown clay loam that has strong brown and light brownish gray mottles

44 to 57 inches—light yellowish brown sandy clay loam that has strong brown mottles

*Underlying material:*

57 to 65 inches—light gray sandy clay loam that has pockets of sandy clay

65 to 72 inches—light gray sandy clay loam that has pockets of sandy clay and brownish yellow and strong brown mottles

### **Soil Properties and Qualities**

*Depth class:* Very deep

*Drainage class:* Moderately well drained

*Permeability:* Moderate

*Available water capacity:* High

*Depth to high water table:* 1.5 to 2.5 feet from December through April

*Hazard of flooding:* Rare

*Shrink-swell potential:* Low

*Surface runoff:* Slow

*Hazard of water erosion:* Slight

*Slope class:* Nearly level

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Extremely acid to moderately acid throughout, except where the surface layer has been limed

*Parent material:* Loamy fluvial sediments

*Depth to bedrock:* More than 60 inches

### **Inclusions**

*Dissimilar inclusions:*

- The poorly drained Wehadkee soils and somewhat poorly drained Chewacla soils on flood plains
- Poorly drained loamy and clayey soils in depressions on low stream terraces
- Well drained loamy soils in the slightly higher landscape positions

*Similar inclusions:*

- Altavista soils that have a surface layer of fine sandy loam

### **Use and Management**

**Major uses:** Cropland and pasture and hayland

#### **Cropland**

*Suitability:* Well suited

*Management concerns:* Flooding, wetness, and fertility

*Management measures:*

- Harvesting row crops as early as possible helps to reduce the risk of damage caused by flooding.
- Tilling when the soil is dry helps to reduce clodding and crusting.
- Installing a subsurface drainage system helps to improve the productivity of moisture-sensitive crops, such as tobacco.
- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management concerns:* Flooding, wetness, and fertility

*Management measures:*

- Harvesting hay crops as early as possible helps to reduce the risk of damage caused by flooding.
- Grazing only when the soil is dry and avoiding overgrazing help to prevent compaction and a rough surface and increase productivity.
- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

#### **Woodland**

*Suitability:* Well suited

*Productivity:* High

*Management concerns:* Competition from undesirable plants

*Management measures:*

- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.
- Planting the appropriate species, as recommended by a forester, helps to maximize productivity and ensure planting success.

#### **Urban development**

*Suitability:* Poorly suited

*Management concerns:* Flooding, wetness, and corrosivity

**Management measures:**

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Selecting the highest area of the landscape for building site development and installing an artificial drainage system help to reduce the risk of damage caused by wetness and flooding.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

**Interpretive Groups**

*Land capability classification:* IIw

*Woodland ordination symbol:* 10A, based on loblolly pine as the indicator species

**ApB—Appling sandy loam, 2 to 6 percent slopes****Setting**

*Landscape:* Piedmont uplands

*Landform:* Broad ridges

*Shape of areas:* Rounded or irregularly shaped

*Size of areas:* 10 to 300 acres

**Composition**

Appling soil and similar inclusions: 70 percent

Dissimilar inclusions: 30 percent

**Typical Profile**

*Surface layer:*

0 to 6 inches—yellowish brown sandy loam

*Subsurface layer:*

6 to 11 inches—yellowish brown sandy loam

*Subsoil:*

11 to 41 inches—yellowish red clay loam that has yellowish brown mottles

41 to 65 inches—yellowish red sandy clay loam that has very pale brown mottles

**Soil Properties and Qualities**

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* High

*Depth to high water table:* More than 6 feet

*Shrink-swell potential:* Low

*Surface runoff:* Medium

*Hazard of water erosion:* Moderate

*Slope class:* Gently sloping

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Very strongly acid or strongly acid throughout, except where the surface layer has been limed

*Parent material:* Residuum weathered from felsic intrusive rocks

*Depth to bedrock:* More than 60 inches

**Inclusions**

*Dissimilar inclusions:*

- The slowly permeable Vance soils on narrow ridges and knolls
- Random areas of Wedowee soils that have saprolite within a depth of 40 inches
- Pacolet soils on hill slopes that have a subsoil that is redder than that of the Appling soil and have saprolite within a depth of 45 inches
- Random areas of eroded Appling soils that have a surface layer of clay loam or sandy clay loam

*Similar inclusions:*

- Appling soils that have a surface layer of loam, fine sandy loam, or coarse sandy loam

**Use and Management**

**Major uses:** Cropland, pasture and hayland, and woodland

**Cropland**

*Suitability:* Well suited

*Management concerns:* Fertility and erodibility

*Management measures:*

- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.
- Terraces and diversions, stripcropping, contour farming, no-till farming, and crop residue management reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.

**Pasture and hayland**

*Suitability:* Well suited

*Management concerns:* Fertility and erodibility

*Management measures:*

- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

**Woodland**

*Suitability:* Well suited

*Productivity:* Moderately high

*Management concerns:* Competition from undesirable plants

**Management measures:**

- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.
- Planting the appropriate species, as recommended by a forester, helps to maximize productivity and ensure planting success.

**Urban development**

*Suitability:* Suited

*Management concerns:* Restricted permeability, low strength, and corrosivity

**Management measures:**

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Installing the distribution lines of septic systems during dry periods helps to prevent smearing and sealing of trench walls.
- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

**Interpretive Groups**

*Land capability classification:* IIe

*Woodland ordination symbol:* 8A, based on loblolly pine as the indicator species

**ApC—Appling sandy loam, 6 to 10 percent slopes****Setting**

*Landscape:* Piedmont uplands

*Landform:* Broad to narrow hill slopes

*Shape of areas:* Long or irregularly shaped

*Size of areas:* 5 to 75 acres

**Composition**

Appling soil and similar inclusions: 70 percent

Dissimilar inclusions: 30 percent

**Typical Profile**

*Surface layer:*

0 to 5 inches—brown sandy loam

*Subsurface layer:*

5 to 9 inches—reddish yellow sandy loam

*Subsoil:*

9 to 44 inches—yellowish red clay loam

*Underlying material:*

44 to 72 inches—multicolored sandy loam saprolite in shades of red, brown, and white

**Soil Properties and Qualities**

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* High

*Depth to high water table:* More than 6 feet

*Shrink-swell potential:* Low

*Surface runoff:* Medium

*Hazard of water erosion:* Severe

*Slope class:* Strongly sloping

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Very strongly acid or strongly acid throughout, except where the surface layer has been limed

*Parent material:* Residuum weathered from felsic intrusive rocks

*Depth to bedrock:* More than 60 inches

**Inclusions****Dissimilar inclusions:**

- Random areas of the slowly permeable Vance soils
- Random areas of Wedowee soils that have saprolite within a depth of 40 inches
- Pacolet soils on hill slopes that have a subsoil that is redder than that of the Appling soil and have saprolite within a depth of 45 inches
- Random areas of eroded Appling soils that have a surface layer of clay loam or sandy clay loam

**Similar inclusions:**

- Appling soils that have a surface layer of loam, fine sandy loam, or coarse sandy loam

**Use and Management**

**Major uses:** Cropland, pasture and hayland, and woodland

**Cropland**

*Suitability:* Suited

*Management concerns:* Fertility and erodibility

**Management measures:**

- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.
- Conservation tillage, stripcropping, crop residue management, and sod-based rotations reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.

**Pasture and hayland**

*Suitability:* Well suited

*Management concerns:* Fertility and erodibility

**Management measures:**

- The pasture can be renovated as needed by applying

the proper amounts of lime and fertilizer and by planting suitable seed mixtures.

- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

### **Woodland**

*Suitability:* Well suited

*Productivity:* Moderately high

*Management concerns:* Competition from undesirable plants

*Management measures:*

- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.
- Planting the appropriate species, as recommended by a forester, helps to maximize productivity and ensure planting success.

### **Urban development**

*Suitability:* Suited

*Management concerns:* Restricted permeability, slope, low strength, and corrosivity

*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Installing the distribution lines of septic systems during dry periods helps to prevent smearing and sealing of trench walls.
- Structures should be designed so that they conform to the natural slope of the land or constructed in the less sloping areas.
- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### **Interpretive Groups**

*Land capability classification:* IIIe

*Woodland ordination symbol:* 8A, based on loblolly pine as the indicator species

## **AuC—Appling-Urban land complex, 2 to 10 percent slopes**

### **Setting**

*Landscape:* Piedmont uplands

*Landform:* Ridges and hill slopes

*Shape of areas:* Irregularly shaped

*Size of areas:* 15 to 300 acres

### **Composition**

Appling soil and similar inclusions: 45 percent

Urban land: 35 percent

Dissimilar inclusions: 20 percent

### **Typical Profile**

#### **Appling**

*Surface layer:*

0 to 8 inches—light yellowish brown sandy loam

*Subsurface layer:*

8 to 12 inches—light yellowish brown sandy loam

*Subsoil:*

12 to 18 inches—brownish yellow and light yellowish brown clay loam

18 to 25 inches—brownish yellow clay loam

25 to 32 inches—brownish yellow sandy clay

32 to 39 inches—reddish yellow sandy clay

39 to 48 inches—reddish yellow, brownish yellow, and light gray clay

48 to 55 inches—strong brown clay loam

*Underlying material:*

55 to 65 inches—multicolored sandy loam saprolite in shades of red, brown, and white

### **Soil Properties and Qualities**

#### **Appling**

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* High

*Depth to high water table:* More than 6 feet

*Shrink-swell potential:* Low

*Surface runoff:* Medium or rapid

*Hazard of water erosion:* None to moderate

*Slope class:* Gently sloping to strongly sloping

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Very strongly acid or strongly acid throughout, except where the surface layer has been limed

*Parent material:* Residuum weathered from felsic intrusive rocks

*Depth to bedrock:* More than 60 inches

### **Urban land**

- These areas are covered by roads, parking lots, closely spaced buildings, and other urban structures. Identification of the soils series is not feasible.

### **Inclusions**

*Dissimilar inclusions:*

- The moderately well drained Helena soils in depressions and along drainageways



- Random areas of the slowly permeable Vance soils
- Random areas of the slowly permeable Enon soils

*Similar inclusions:*

- Applying soils that have a surface layer of loam, fine sandy loam, or coarse sandy loam

### **Use and Management**

**Major uses:** Urban development

#### **Cropland**

*Suitability:* Poorly suited

*Management concerns:*

- Managing areas of this map unit for crop production is difficult because of the limited size of the areas, intermittent areas of urban land, and areas of highly disturbed soils.

#### **Pasture and hayland**

*Suitability:* Poorly suited

*Management concerns:*

- Managing areas of this map unit for the production of pasture and hay crops is difficult because of the limited size of the areas, intermittent areas of urban land, and areas of highly disturbed soils.

#### **Woodland**

*Suitability:* Poorly suited

*Management concerns:*

- This map unit has severe limitations affecting timber production because of the limited size of the areas, intermittent areas of urban land, and areas of highly disturbed soils.

#### **Urban development**

*Suitability:* Suited

*Management concerns:* Restricted permeability, slope, low strength, and corrosivity

*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Installing the distribution lines of septic systems during dry periods helps to prevent smearing and sealing of trench walls.
- Structures should be designed so that they conform to the natural slope of the land or constructed in the less sloping areas.
- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### **Interpretive Groups**

*Land capability classification:* Appling—IIIe; Urban land—VIIIs

*Woodland ordination symbol:* None assigned

## **CaB—Cecil sandy loam, 2 to 6 percent slopes**

### **Setting**

*Landscape:* Piedmont uplands

*Landform:* Broad ridges

*Shape of areas:* Rounded or irregularly shaped

*Size of areas:* 10 to 350 acres

### **Composition**

Cecil soil and similar inclusions: 70 percent

Dissimilar inclusions: 30 percent

### **Typical Profile**

*Surface layer:*

0 to 8 inches—strong brown sandy loam

*Subsoil:*

8 to 24 inches—red clay that has red and strong brown mottles

24 to 40 inches—red clay that has strong brown mottles

40 to 55 inches—red clay loam

*Underlying material:*

55 to 65 inches—multicolored sandy loam saprolite in shades of red, yellow, and white

### **Soil Properties and Qualities**

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* High

*Depth to high water table:* More than 6 feet

*Shrink-swell potential:* Low

*Surface runoff:* Medium

*Hazard of water erosion:* Moderate

*Slope class:* Gently sloping

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Very strongly acid to moderately acid in the A horizon, except where limed, and strongly acid or very strongly acid in the B and C horizons

*Parent material:* Residuum weathered from felsic intrusive rocks

*Depth to bedrock:* More than 60 inches

### **Inclusions**

*Dissimilar inclusions:*

- The slowly permeable Vance soils on narrow ridges and knolls
- Random areas of Wedowee soils that have a subsoil that is yellower than that of the Cecil soil and have saprolite within a depth of 45 inches
- Random areas of Pacolet soils that have saprolite within a depth of 45 inches on hill slopes
- Random areas of eroded Cecil soils that have a surface layer of clay loam

*Similar inclusions:*

- Cecil soils that have a surface layer of loam

***Use and Management***

**Major uses:** Cropland, pasture and hayland, and woodland

**Cropland**

*Suitability:* Well suited

*Management concerns:* Fertility and erodibility

*Management measures:*

- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.
- Terraces and diversions, stripcropping, contour farming, no-till farming, and crop residue management reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.

**Pasture and hayland**

*Suitability:* Well suited

*Management concerns:* Fertility and erodibility

*Management measures:*

- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

**Woodland**

*Suitability:* Well suited

*Productivity:* Moderately high

*Management concerns:* Competition from undesirable plants

*Management measures:*

- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.
- Planting the appropriate species, as recommended by a forester, helps to maximize productivity and ensure planting success.

**Urban development**

*Suitability:* Suited

*Management concerns:* Restricted permeability, low strength, and corrosivity

*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Installing the distribution lines of septic systems during dry periods helps to prevent smearing and sealing of trench walls.

- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

***Interpretive Groups***

*Land capability classification:* IIe

*Woodland ordination symbol:* 8A, based on loblolly pine as the indicator species

**CeB2—Cecil clay loam, 2 to 6 percent slopes, eroded*****Setting***

*Landscape:* Piedmont uplands

*Landform:* Broad to narrow ridges

*Shape of areas:* Rounded or irregularly shaped

*Size of areas:* 10 to 250 acres

***Composition***

Cecil soil and similar inclusions: 80 percent

Dissimilar inclusions: 20 percent

***Typical Profile***

*Surface layer:*

0 to 8 inches—red clay loam

*Subsoil:*

8 to 48 inches—red clay

48 to 58 inches—mixed red and pale yellow clay loam

*Underlying material:*

58 to 65 inches—multicolored clay loam saprolite in shades of red, yellow, and white

***Soil Properties and Qualities***

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* High

*Depth to high water table:* More than 6 feet

*Shrink-swell potential:* Low

*Surface runoff:* Medium

*Hazard of water erosion:* Severe

*Slope class:* Gently sloping

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Very strongly acid to moderately acid in the A horizon, except where limed, and very strongly acid or strongly acid in the B and C horizons

*Parent material:* Residuum weathered from felsic intrusive rocks

*Depth to bedrock:* More than 60 inches

### ***Inclusions***

#### *Dissimilar inclusions:*

- Random areas of Georgeville soils that have more silt than the Cecil soil
- Random areas of Pacolet soils that have saprolite within a depth of 45 inches on hill slopes
- Soils that have a dark red subsoil and formed from mixed felsic and mafic intrusive rocks
- Random areas of noneroded Cecil soils that have a surface layer of sandy loam

#### *Similar inclusions:*

- Cecil soils that have a surface layer of sandy clay loam

### ***Use and Management***

**Major uses:** Cropland, pasture and hayland, and woodland

#### **Cropland**

*Suitability:* Well suited

*Management concerns:* Erodibility, fertility, and tilth

*Management measures:*

- Terraces and diversions, stripcropping, contour farming, no-till farming, and crop residue management reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.
- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.
- Returning crop residue to the soil or leaving residue on the surface helps to improve tilth and increases the infiltration of rainfall.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management concerns:* Erodibility and fertility

*Management measures:*

- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

#### **Woodland**

*Suitability:* Well suited

*Productivity:* Moderately high

*Management concerns:* Equipment limitation, seedling survival, and competition from undesirable plants

*Management measures:*

- Unsurfaced roads may be impassible during wet

periods because of the content of clay in the surface layer.

- Special site preparation, such as chopping and burning, helps to establish seedlings, reduces mortality, and increases early seedling growth.
- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.
- Planting the appropriate species, as recommended by a forester, helps to maximize productivity and ensure planting success.

#### **Urban development**

*Suitability:* Suited

*Management concerns:* Restricted permeability, low strength, and corrosivity

*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Installing the distribution lines of septic systems during dry periods helps to prevent smearing and sealing of trench walls.
- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### ***Interpretive Groups***

*Land capability classification:* IIIe

*Woodland ordination symbol:* 7C, based on loblolly pine as the indicator species

### **CeC2—Cecil clay loam, 6 to 10 percent slopes, eroded**

#### ***Setting***

*Landscape:* Piedmont uplands

*Landform:* Narrow hill slopes

*Shape of areas:* Long and narrow or irregularly shaped

*Size of areas:* 10 to 250 acres

#### ***Composition***

Cecil soil and similar inclusions: 85 percent

Dissimilar inclusions: 15 percent

#### ***Typical Profile***

*Surface layer:*

0 to 2 inches—yellowish red clay loam

*Subsurface layer:*

2 to 7 inches—yellowish red clay loam

*Subsoil:*

7 to 26 inches—red clay

26 to 48 inches—yellowish red clay loam

48 to 55 inches—yellowish red clay loam

*Underlying material:*

55 to 65 inches—multicolored loam saprolite in shades of red, yellow, and white

### ***Soil Properties and Qualities***

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* High

*Depth to high water table:* More than 6 feet

*Shrink-swell potential:* Low

*Surface runoff:* Medium

*Hazard of water erosion:* Very severe

*Slope class:* Strongly sloping

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Very strongly acid to moderately acid in the A horizon, except where limed, and very strongly acid or strongly acid in the B and C horizons

*Parent material:* Residuum weathered from felsic intrusive rocks

*Depth to bedrock:* More than 60 inches

### ***Inclusions***

*Dissimilar inclusions:*

- Random areas of Tatum soils that have saprolite at a depth of 30 to 60 inches
- Random areas of Wedowee soils that have a subsoil that is yellower than that of the Cecil soil and have saprolite within a depth of 40 inches
- Random areas of Pacolet soils that have saprolite within a depth of 45 inches
- Random areas of noneroded Cecil soils that have a surface layer of fine sandy loam, sandy loam, or loam

*Similar inclusions:*

- Cecil soils that have a surface layer of sandy clay loam

### ***Use and Management***

**Major uses:** Cropland, pasture and hayland, and woodland

#### **Cropland**

*Suitability:* Suited

*Management measures:* Erodibility, fertility, and tilth

*Management measures:*

- Terraces and diversions, stripcropping, contour farming, no-till farming, and crop residue management reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.
- Applying lime and fertilizer according to recommendations based on soil tests increases the

availability of plant nutrients and helps to maximize productivity.

- Returning crop residue to the soil or leaving residue on the surface helps to improve tilth and increases the infiltration of rainfall.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management concerns:* Erodibility and fertility

*Management measures:*

- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.
- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.

#### **Woodland**

*Suitability:* Well suited

*Productivity:* Moderately high

*Management concerns:* Equipment limitation, seedling survival, and competition from undesirable plants

*Management measures:*

- Unsurfaced roads may be impassible during wet periods because of the content of clay in the surface layer.
- Special site preparation, such as chopping and burning, helps to establish seedlings, reduces mortality, and increases early seedling growth.
- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.
- Planting the appropriate species, as recommended by a forester, helps to maximize productivity and ensure planting success.

#### **Urban development**

*Suitability:* Suited

*Management concerns:* Restricted permeability, slope, low strength, and corrosivity

*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Installing the distribution lines of septic systems during dry periods helps to prevent smearing and sealing of trench walls.
- Structures should be designed so that they conform to the natural slope of the land or constructed in the less sloping areas.
- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.

- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### ***Interpretive Groups***

*Land capability classification:* IVe

*Woodland ordination symbol:* 7C, based on loblolly pine as the indicator species

## **ChA—Chewacla and Wehadkee soils, 0 to 2 percent slopes, frequently flooded**

### ***Setting***

*Landscape:* Piedmont drainageways

*Landform:* Chewacla—the slightly higher ridges on flood plains; Wehadkee—the lower swales on flood plains

*Shape of areas:* Broad to narrow and long or irregularly shaped

*Size of areas:* 10 to 100 acres

### ***Composition***

Chewacla soil and similar inclusions: 20 to 80 percent

Wehadkee soil and similar inclusions: 0 to 50 percent

Dissimilar inclusions: 10 to 30 percent

### ***Typical Profile***

#### **Chewacla**

*Surface layer:*

0 to 6 inches—yellowish brown loam

*Subsoil:*

6 to 15 inches—yellowish brown loam

15 to 19 inches—dark yellowish brown loam that has pale brown mottles

*Underlying material:*

19 to 33 inches—dark brown loam that has gray mottles

33 to 65 inches—light brownish gray sandy loam that has yellowish brown mottles

#### **Wehadkee**

*Surface layer:*

0 to 3 inches—brown loam

3 to 7 inches—brown loam that has brown mottles

7 to 11 inches—dark gray loam that has brown and dark brown mottles

11 to 14 inches—dark gray silt loam that has dark brown and brown mottles

*Subsoil:*

14 to 22 inches—dark gray loam that has brown mottles

22 to 42 inches—gray sandy clay loam that has strong brown mottles

*Underlying material:*

42 to 72 inches—gray stratified loamy sand, sand, and sandy loam having greenish gray mottles

## ***Soil Properties and Qualities***

*Depth class:* Very deep

*Drainage class:* Chewacla—somewhat poorly drained; Wehadkee—poorly drained

*Permeability:* Moderate

*Available water capacity:* Moderate

*Depth to high water table:* Chewacla—0.5 foot to 1.5 feet from November through April; Wehadkee—0 to 1.0 foot from November through May

*Hazard of flooding:* Chewacla—frequently flooded for brief to long periods from November through April; Wehadkee—frequently flooded for brief periods from November through June

*Shrink-swell potential:* Low

*Surface runoff:* Chewacla—slow; Wehadkee—very slow

*Hazard of water erosion:* None or slight

*Slope class:* Nearly level

*Organic matter content:* Moderate

*Natural fertility:* Moderate

*Reaction:* Chewacla—very strongly acid to slightly acid in the upper 40 inches, except where the surface layer has been limed, and very strongly acid to moderately alkaline below a depth of 40 inches; Wehadkee—very strongly acid to neutral

*Parent material:* Alluvial sediments

*Depth to bedrock:* More than 60 inches

### ***Inclusions***

*Dissimilar inclusions:*

- The well drained or moderately well drained Congaree soils in the slightly higher landscape positions adjacent to streams

*Similar inclusions:*

- Chewacla and Wehadkee soils that have a surface layer of silt loam, fine sandy loam, sandy loam, or loamy sand

## ***Use and Management***

**Major uses:** Woodland and wildlife habitat

### **Cropland**

*Suitability:* Chewacla—poorly suited; Wehadkee—unsuited

*Management concerns:* Flooding and wetness

*Management measures:*

- These soils have severe limitations affecting crop production.
- A better suited soil should be selected.

### **Pasture and hayland**

*Suitability:* Poorly suited

*Management concerns:* Flooding, wetness, and fertility



**Management measures:**

- Harvesting hay crops as early as possible helps to reduce the risk of damage caused by flooding.
- Grazing only when the soils are dry and avoiding overgrazing help to prevent compaction and a rough surface and increase productivity.
- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

**Woodland**

*Suitability:* Chewacla—well suited; Wehadkee—suited

*Productivity:* Moderately high

*Management concerns:* Chewacla—equipment limitation, windthrow hazard, and competition from undesirable plants; Wehadkee—equipment limitation, seedling survival, windthrow hazard, and competition from undesirable plants

**Management measures:**

- Harvesting timber during summer helps to reduce the risk of damage caused by flooding.
- Using standard wheeled and tracked equipment only during dry periods helps to prevent rutting and compaction.
- Periodically harvesting windthrown trees that result from high winds and a limited rooting depth can increase productivity.
- Preparing a seedbed helps to establish seedlings and increases the survival rate.
- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.
- Establishing a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade.

**Urban development**

*Suitability:* Unsited

*Management concerns:* Flooding, wetness, and corrosivity

**Management measures:**

- These soils have severe limitations affecting urban development.
- A better suited soil should be selected.

**Interpretive Groups**

*Land capability classification:* Chewacla—IVw; Wehadkee—VIw

*Woodland ordination symbol:* Based on yellow-poplar as the indicator species, 7W in areas of the Chewacla soil and 8W in areas of the Wehadkee soil

**CoA—Congaree silt loam, 0 to 2 percent slopes, frequently flooded****Setting**

*Landscape:* Piedmont drainageways

*Landform:* Flood plains

*Shape of areas:* Narrow and long or irregularly shaped

*Size of areas:* 5 to 50 acres

**Composition**

Congaree soil and similar inclusions: 85 percent

Dissimilar inclusions: 15 percent

**Typical Profile**

*Surface layer:*

0 to 12 inches—yellowish brown silt loam

*Underlying material:*

12 to 19 inches—yellowish brown loam

19 to 25 inches—dark yellowish brown silt loam

25 to 45 inches—dark yellowish brown sandy loam that has yellowish brown mottles

45 to 65 inches—dark brown loam that has gray and dusky red mottles

65 to 70 inches—mottled yellow, gray, and brown fine sandy loam

70 to 80 inches—mottled strong brown, yellowish brown, and gray fine sandy loam

**Soil Properties and Qualities**

*Depth class:* Very deep

*Drainage class:* Moderately well drained or well drained

*Permeability:* Moderate

*Available water capacity:* High

*Depth to high water table:* 2.5 to 4.0 feet from November through April

*Hazard of flooding:* Frequently flooded for brief periods from November through April

*Shrink-swell potential:* Low

*Surface runoff:* Slow

*Hazard of water erosion:* None or slight

*Slope class:* Nearly level

*Organic matter content:* Moderate

*Natural fertility:* Moderate

*Reaction:* Very strongly acid to neutral throughout, except where the surface layer has been limed

*Parent material:* Alluvial sediments

*Depth to bedrock:* More than 60 inches

**Inclusions**

*Dissimilar inclusions:*

- The somewhat poorly drained Chewacla soils and poorly drained Wehadkee soils in the lower depressions adjacent to uplands and along drainageways

*Similar inclusions:*

- Congaree soils that have a surface layer of loam or sandy loam

**Use and Management**

**Major uses:** Pasture and hayland and woodland

**Cropland**

*Suitability:* Poorly suited (fig. 5)

*Management concerns:* Flooding and wetness

*Management measures:*

- Because of the potential for flooding during the growing season, managing this soil for cropland is difficult.
- Installing a subsurface drainage system helps to improve the productivity of moisture-sensitive crops.
- Tilling when the soil is dry helps to reduce clodding and crusting.

**Pasture and hayland**

*Suitability:* Suited

*Management concerns:* Flooding, wetness, and fertility

*Management measures:*

- Harvesting hay crops as early as possible helps to reduce the risk of damage caused by flooding.
- Grazing only when the soil is dry and avoiding overgrazing help to prevent compaction and a rough surface and increase productivity.
- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

**Woodland**

*Suitability:* Well suited

*Productivity:* Moderately high

*Management concerns:* Equipment limitation and competition from undesirable plants

*Management measures:*

- Harvesting timber during summer helps to reduce the risk of damage caused by flooding.
- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.
- Establishing a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade.

**Urban development**

*Suitability:* Poorly suited

*Management concerns:* Flooding and wetness

*Management measures:*

- This soil has severe limitations affecting urban development.
- A better suited soil should be selected.

**Interpretive Groups**

*Land capability classification:* IIIw

*Woodland ordination symbol:* 7A, based on loblolly pine as the indicator species

**CrB—Creedmoor coarse sandy loam, 2 to 6 percent slopes****Setting**

*Landscape:* Piedmont uplands

*Landform:* Broad ridges

*Shape of areas:* Rounded or irregularly shaped

*Size of areas:* 15 to 300 acres

**Composition**

Creedmoor soil and similar inclusions: 80 percent

Dissimilar inclusions: 20 percent

**Typical Profile**

*Surface layer:*

0 to 7 inches—brown coarse sandy loam

*Subsoil:*

7 to 18 inches—mottled brownish yellow, red, and light gray clay

18 to 36 inches—mottled yellowish brown, light gray, red, and reddish yellow clay

36 to 52 inches—mottled reddish yellow, light gray, yellowish red, and brown clay

52 to 68 inches—mottled dark gray, reddish yellow, and red silty clay loam

*Underlying material:*

68 to 83 inches—mottled dark gray, light gray, and reddish yellow silty clay loam saprolite

**Soil Properties and Qualities**

*Depth class:* Very deep

*Drainage class:* Moderately well drained or somewhat poorly drained

*Permeability:* Very slow

*Available water capacity:* High

*Depth to high water table:* 1.5 to 2.0 feet from January through March

*Shrink-swell potential:* High

*Surface runoff:* Medium

*Hazard of water erosion:* Moderate

*Slope class:* Gently sloping

*Organic matter content:* Low



**Figure 5.—Corn in an area of Congaree silt loam, 0 to 2 percent slopes, frequently flooded. Flooding is a major limitation affecting row crops on this soil.**

*Natural fertility:* Low

*Reaction:* Extremely acid to strongly acid throughout, except where the surface layer has been limed

*Parent material:* Residuum weathered from interbedded sedimentary rocks

*Depth to bedrock:* More than 60 inches

### ***Inclusions***

#### *Dissimilar inclusions:*

- The well drained Mayodan soils on the slightly higher convex knolls and ridges
- Poorly drained soils in the slightly lower landscape positions

#### *Similar inclusions:*

- Creedmoor soils that have a surface layer of sandy loam or loamy sand

### ***Use and Management***

**Major uses:** Cropland, pasture and hayland, woodland, and urban development

#### **Cropland**

*Suitability:* Well suited

*Management concerns:* Wetness, root penetration, fertility, and erodibility

#### *Management measures:*

- An artificial drainage system helps to reduce wetness and improves the productivity of this soil.
- Tilling when the soil is dry helps to reduce clodding and crusting.
- Planting perennial grasses and legumes in rotation helps to break up the clayey root zone.
- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.
- Terraces and diversions, stripcropping, contour farming, no-till farming, and crop residue management reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management concerns:* Wetness, fertility, and erodibility

#### *Management measures:*

- Planting wetness-tolerant species in undrained areas helps to improve the productivity of this soil.
- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

#### **Woodland**

*Suitability:* Well suited

*Productivity:* High

*Management concerns:* Competition from undesirable plants

#### *Management measures:*

- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.
- Planting the appropriate species, as recommended by a forester, helps to maximize productivity and ensure planting success.

#### **Urban development**

*Suitability:* Poorly suited

*Management concerns:* Wetness, restricted permeability, shrink-swell potential, low strength, and corrosivity

#### *Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Using a subsurface drainage system helps to reduce the risk of damage caused by wetness.
- Reinforcing foundations or backfilling with coarse-textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### ***Interpretive Groups***

*Land capability classification:* IIe

*Woodland ordination symbol:* 9A, based on loblolly pine as the indicator species

## **CrC—Creedmoor coarse sandy loam, 6 to 10 percent slopes**

### ***Setting***

*Landscape:* Piedmont uplands

*Landform:* Hill slopes

*Shape of areas:* Long and narrow or irregularly shaped

*Size of areas:* 15 to 150 acres

### ***Composition***

Creedmoor soil and similar inclusions: 80 percent

Dissimilar inclusions: 20 percent

### ***Typical Profile***

#### *Surface layer:*

0 to 8 inches—yellowish brown coarse sandy loam

#### *Subsurface layer:*

8 to 15 inches—yellowish brown sandy loam that has brown mottles

#### *Subsoil:*

15 to 23 inches—yellowish brown clay that has red and light gray mottles

23 to 35 inches—pale brown clay that has brown and light gray mottles

*Underlying material:*

35 to 65 inches—multicolored sandy clay loam saprolite in shades of white and brown

### ***Soil Properties and Qualities***

*Depth class:* Very deep

*Drainage class:* Moderately well drained or somewhat poorly drained

*Permeability:* Very slow

*Available water capacity:* High

*Depth to high water table:* 1.5 to 2.0 feet from January through March

*Shrink-swell potential:* High

*Surface runoff:* Medium

*Hazard of water erosion:* Severe

*Slope class:* Moderately sloping

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Extremely acid to strongly acid throughout, except where the surface layer has been limed

*Parent material:* Residuum weathered from interbedded sedimentary rocks

*Depth to bedrock:* More than 60 inches

### ***Inclusions***

*Dissimilar inclusions:*

- The well drained Mayodan soils on the slightly higher convex knolls and ridges
- Random areas of the well drained Pinkston soils that have hard bedrock at a depth of 20 to 40 inches
- Well drained soils that have a loamy subsoil and have hard bedrock below a depth of 60 inches

*Similar inclusions:*

- Creedmoor soils that have a surface layer of sandy loam or loamy sand

### ***Use and Management***

**Major uses:** Cropland, pasture and hayland, woodland, and urban development

#### **Cropland**

*Suitability:* Suited

*Management concerns:* Erodibility, wetness, root penetration, and fertility

*Management measures:*

- Terraces and diversions, stripcropping, contour farming, no-till farming, and crop residue management reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.
- An artificial drainage system helps to reduce wetness and improves the productivity of this soil.

- Tilling when the soil is dry helps to reduce clodding and crusting.

- Planting perennial grasses and legumes in rotation helps to break up the clayey root zone.

- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management concerns:* Erodibility, wetness, and fertility

*Management measures:*

- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

#### **Woodland**

*Suitability:* Well suited

*Productivity:* High

*Management concerns:* Competition from undesirable plants

*Management measures:*

- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.
- Planting the appropriate species, as recommended by a forester, helps to maximize productivity and ensure planting success.

#### **Urban development**

*Suitability:* Poorly suited

*Management concerns:* Wetness, restricted permeability, shrink-swell potential, slope, low strength, and corrosivity

*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Selecting the highest area of the landscape for building site development and installing an artificial drainage system help to reduce the risk of damage caused by wetness.
- Reinforcing foundations or backfilling with coarse-textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Structures should be designed so that they conform to the natural slope of the land or constructed in the less sloping areas.

- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### ***Interpretive Groups***

*Land capability classification:* IIIe

*Woodland ordination symbol:* 9A, based on loblolly pine as the indicator species

## **EnB—Enon loam, 2 to 6 percent slopes**

### ***Setting***

*Landscape:* Piedmont uplands

*Landform:* Convex knolls and ridges

*Shape of areas:* Rounded or irregularly shaped

*Size of areas:* 5 to 100 acres

### ***Composition***

Enon soil and similar inclusions: 95 percent

Dissimilar inclusions: 5 percent

### ***Typical Profile***

*Surface layer:*

0 to 5 inches—grayish brown loam

*Subsoil:*

5 to 23 inches—yellowish brown clay

23 to 48 inches—mixed brownish yellow and yellowish brown clay loam

*Underlying material:*

48 to 65 inches—multicolored loam saprolite in shades of red and brown

### ***Soil Properties and Qualities***

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Slow

*Available water capacity:* High

*Depth to high water table:* More than 6 feet

*Shrink-swell potential:* High

*Surface runoff:* Medium

*Hazard of water erosion:* Moderate

*Slope class:* Gently sloping

*Organic matter content:* Low

*Natural fertility:* Moderate

*Reaction:* Strongly acid to slightly acid in the A horizon and the upper part of the B horizon, except where limed, and strongly acid to slightly alkaline in the lower part of the B horizon and in the C horizon

*Parent material:* Residuum weathered from mafic intrusive rocks

*Depth to bedrock:* More than 60 inches

### ***Inclusions***

*Dissimilar inclusions:*

- The moderately well drained Iredell soils in slight depressions
- The poorly drained Picture soils in slight depressions and on broad flats

*Similar inclusions:*

- Enon soils that have a surface layer of fine sandy loam

### ***Use and Management***

**Major uses:** Cropland, woodland, and pasture and hayland

#### **Cropland**

*Suitability:* Well suited

*Management concerns:* Root penetration, erodibility, and fertility

*Management measures:*

- Planting perennial grasses and legumes in rotation helps to break up the clayey root zone.
- Terraces and diversions, stripcropping, contour farming, no-till farming, and crop residue management reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.
- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management concerns:* Erodibility and fertility

*Management measures:*

- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

#### **Woodland**

*Suitability:* Well suited

*Productivity:* Moderately high

*Management concerns:* Equipment limitation

*Management measures:*

- Logging during dry periods helps to prevent rutting and root damage resulting from compaction.
- Unsurfaced roads may be impassible during wet periods because of the high content of clay.
- Planting the appropriate species, as recommended by



a forester, helps to maximize productivity and ensure planting success.

### **Urban development**

*Suitability:* Poorly suited

*Management concerns:* Restricted permeability, shrink-swell potential, low strength, and corrosivity

*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Installing the distribution lines of septic systems during dry periods helps to prevent smearing and sealing of trench walls.
- Reinforcing foundations or backfilling with coarse-textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### **Interpretive Groups**

*Land capability classification:* IIe

*Woodland ordination symbol:* 8A, based on loblolly pine as the indicator species

## **EnC—Enon loam, 6 to 10 percent slopes**

### **Setting**

*Landscape:* Piedmont uplands

*Landform:* Hill slopes

*Shape of areas:* Long and narrow or irregularly shaped

*Size of areas:* 5 to 75 acres

### **Composition**

Enon soil and similar inclusions: 70 percent

Dissimilar inclusions: 30 percent

### **Typical Profile**

*Surface layer:*

0 to 5 inches—dark brown loam

*Subsoil:*

5 to 17 inches—dark yellowish brown clay

17 to 21 inches—yellowish brown clay

21 to 25 inches—yellowish brown clay loam that has yellowish brown and dark brown mottles

*Underlying material:*

25 to 65 inches—multicolored sandy clay loam saprolite in shades of brown and yellow

### **Soil Properties and Qualities**

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Slow

*Available water capacity:* High

*Depth to high water table:* More than 6 feet

*Shrink-swell potential:* High

*Surface runoff:* Medium

*Hazard of water erosion:* Severe

*Slope class:* Moderately sloping

*Organic matter content:* Low

*Natural fertility:* Moderate

*Reaction:* Strongly acid to slightly acid in the A horizon and the upper part of the B horizon, except where limed, and strongly acid to slightly alkaline in the lower part of the B horizon and in the C horizon

*Parent material:* Residuum weathered from mafic intrusive rocks

*Depth to bedrock:* More than 60 inches

### **Inclusions**

*Dissimilar inclusions:*

- Random areas of the moderately permeable Cecil and Appling soils
- Random areas of the moderately permeable Wedowee soils
- Soils that have cobble-sized or larger rock fragments within a depth of 20 inches
- Random areas of clayey soils that have bedrock at a depth of 20 to 40 inches

*Similar inclusions:*

- Enon soils that have a surface layer of fine sandy loam or sandy loam

### **Use and Management**

**Major uses:** Cropland, pasture and hayland, and woodland

#### **Cropland**

*Suitability:* Suited

*Management concerns:* Erodibility, root penetration, and fertility

*Management measures:*

- Planting perennial grasses and legumes in rotation helps to break up the clayey root zone.
- Terraces and diversions, stripcropping, contour farming, no-till farming, and crop residue management reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management concerns:* Erodibility and fertility

*Management measures:*

- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- The pasture can be renovated as needed by applying

the proper amounts of lime and fertilizer and by planting suitable seed mixtures.

- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

### **Woodland**

*Suitability:* Well suited

*Productivity:* Moderately high

*Management concerns:* Equipment limitation

*Management measures:*

- Logging during dry periods helps to prevent rutting and root damage resulting from compaction.
- Unsurfaced roads may be impassible during wet periods because of the high content of clay.
- Planting the appropriate species, as recommended by a forester, helps to maximize productivity and ensure planting success.

### **Urban development**

*Suitability:* Poorly suited

*Management concerns:* Restricted permeability, shrink-swell potential, slope, low strength, and corrosivity

*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Installing the distribution lines of septic systems during dry periods helps to prevent smearing and sealing of trench walls.
- Reinforcing foundations or backfilling with coarse-textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Structures should be designed so that they conform to the natural slope of the land or constructed in the less sloping areas.
- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### **Interpretive Groups**

*Land capability classification:* IIIe

*Woodland ordination symbol:* 8A, based on loblolly pine as the indicator species

## **GeB—Georgeville silt loam, 2 to 6 percent slopes**

### **Setting**

*Landscape:* Piedmont uplands

*Landform:* Broad ridges

*Shape of areas:* Round or irregularly shaped

*Size of areas:* 10 to 350 acres

### **Composition**

Georgeville soil and similar inclusions: 85 percent

Dissimilar inclusions: 15 percent

### **Typical Profile**

*Surface layer:*

0 to 8 inches—strong brown silt loam

*Subsoil:*

8 to 24 inches—red clay

24 to 37 inches—red clay that has reddish yellow mottles

37 to 50 inches—red clay loam that has reddish yellow mottles

50 to 62 inches—red clay loam that has reddish yellow mottles

*Underlying material:*

62 to 72 inches—red silt loam saprolite that has reddish yellow mottles

### **Soil Properties and Qualities**

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* High

*Depth to high water table:* More than 6 feet

*Shrink-swell potential:* Low

*Surface runoff:* Medium

*Hazard of water erosion:* Moderate

*Slope class:* Gently sloping

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Very strongly acid to neutral in the A horizon, except where limed, and very strongly acid or strongly acid in the B and C horizons

*Parent material:* Residuum weathered from mixed felsic and mafic volcanic rocks

*Depth to bedrock:* More than 60 inches

### **Inclusions**

*Dissimilar inclusions:*

- Random areas of Tatum soils that have soft bedrock within a depth of 60 inches
- Random areas of Nason soils that have a subsoil that is yellower than that of the Georgeville soil and have soft bedrock within a depth of 60 inches
- Random areas of Cecil soils that have less silt than the Georgeville soil
- Georgeville soils that contain cobble-sized or larger rock fragments
- Georgeville soils that have a surface layer of clay loam

*Similar inclusions:*

- Georgeville soils that have a surface layer of loam

### ***Use and Management***

**Major uses:** Cropland, pasture and hayland, and woodland

#### **Cropland**

*Suitability:* Well suited

*Management concerns:* Fertility and erodibility

*Management measures:*

- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.
- Terraces and diversions, stripcropping, contour farming, no-till farming, and crop residue management reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall (fig. 6).

#### **Pasture and hayland**

*Suitability:* Well suited

*Management concerns:* Fertility and erodibility

*Management measures:*

- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

#### **Woodland**

*Suitability:* Well suited

*Productivity:* Moderately high

*Management concerns:* Equipment limitation

*Management measures:*

- Logging during dry periods helps to prevent rutting and root damage resulting from compaction.
- Unsurfaced roads may be impassible during wet periods because of the high content of clay.
- Planting the appropriate species, as recommended by a forester, helps to maximize productivity and ensure planting success.

#### **Urban development**

*Suitability:* Suited

*Management concerns:* Restricted permeability, low strength, and corrosivity

*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Installing the distribution lines of septic systems during dry periods helps to prevent smearing and sealing of trench walls.

- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### ***Interpretive Groups***

*Land capability classification:* IIe

*Woodland ordination symbol:* 8A, based on loblolly pine as the indicator species

### **GeC—Georgeville silt loam, 6 to 10 percent slopes**

#### ***Setting***

*Landscape:* Piedmont uplands

*Landform:* Broad to narrow hill slopes

*Shape of areas:* Long or irregularly shaped

*Size of areas:* 20 to 200 acres

#### ***Composition***

Georgeville soil and similar inclusions: 90 percent

Dissimilar inclusions: 10 percent

#### ***Typical Profile***

*Surface layer:*

0 to 5 inches—yellowish red silt loam

*Subsoil:*

5 to 35 inches—red clay

35 to 48 inches—red clay loam

*Underlying material:*

48 to 65 inches—strong brown silt loam saprolite

#### ***Soil Properties and Qualities***

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* High

*Depth to high water table:* More than 6 feet

*Shrink-swell potential:* Low

*Surface runoff:* Medium

*Hazard of water erosion:* Severe

*Slope class:* Moderately sloping

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Very strongly acid to neutral in the A horizon and very strongly acid or strongly acid in the B and C horizons

*Parent material:* Residuum weathered from mixed felsic and mafic volcanic rocks

*Depth to bedrock:* More than 60 inches



Figure 6.—A grassed waterway in an area of Georgeville silt loam, 2 to 6 percent slopes, helps to safely remove excess surface water.

### ***Inclusions***

#### ***Dissimilar inclusions:***

- Random areas of Tatum soils that have soft bedrock within a depth of 60 inches
- Random areas of Nason soils that have a subsoil that is yellower than that of the Georgeville soil and have soft bedrock within a depth of 60 inches

- Random areas of Cecil soils that have less silt than the Georgeville soil
- Georgeville soils that contain cobble-sized or larger rock fragments
- Georgeville soils that have a surface layer of clay loam

*Similar inclusions:*

- Georgeville soils that have a surface layer of loam

***Use and Management***

**Major uses:** Cropland, pasture and hayland, and woodland

**Cropland**

*Suitability:* Suited

*Management concerns:* Erodibility and fertility

*Management measures:*

- Terraces and diversions, stripcropping, contour farming, no-till farming, and crop residue management reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.
- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.

**Pasture and hayland**

*Suitability:* Well suited

*Management concerns:* Fertility and erodibility

*Management measures:*

- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

**Woodland**

*Suitability:* Well suited

*Productivity:* Moderately high

*Management concerns:* Equipment limitation

*Management measures:*

- Logging during dry periods helps to prevent rutting and root damage resulting from compaction.
- Unsurfaced roads may be impassible during wet periods because of the high content of clay.
- Planting the appropriate species, as recommended by a forester, helps to maximize productivity and ensure planting success.

**Urban development**

*Suitability:* Suited

*Management concerns:* Restricted permeability, slope, low strength, and corrosivity

*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Installing the distribution lines of septic systems during

dry periods helps to prevent smearing and sealing of trench walls.

- Structures should be designed so that they conform to the natural slope of the land or constructed in the less sloping areas.
- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

***Interpretive Groups***

*Land capability classification:* IIIe

*Woodland ordination symbol:* 8A, based on loblolly pine as the indicator species

**HeB—Helena sandy loam, 2 to 6 percent slopes*****Setting***

*Landscape:* Piedmont uplands

*Landform:* Interstream divides, head of drainageways, depressions, and the lower hill slopes

*Shape of areas:* Broad and rounded or irregularly shaped

*Size of areas:* 5 to 50 acres

***Composition***

Helena soil and similar inclusions: 80 percent

Dissimilar inclusions: 20 percent

***Typical Profile***

*Surface layer:*

0 to 9 inches—grayish brown sandy loam

*Subsurface layer:*

9 to 12 inches—light yellowish brown sandy loam

*Subsoil:*

12 to 19 inches—brownish yellow sandy clay loam that has strong brown mottles

19 to 24 inches—yellowish brown clay that has pale brown and gray mottles

24 to 40 inches—strong brown clay that has gray mottles

40 to 50 inches—light gray clay loam that has brownish yellow and strong brown mottles

*Underlying material:*

50 to 60 inches—strong brown sandy loam saprolite that has light gray mottles

60 to 72 inches—strong brown sandy loam saprolite that has light gray and yellow mottles

***Soil Properties and Qualities***

*Depth class:* Very deep

*Drainage class:* Moderately well drained

*Permeability:* Slow

*Available water capacity:* Moderate

*Depth to high water table:* 1.5 to 2.5 feet from January through April

*Shrink-swell potential:* High

*Surface runoff:* Medium

*Hazard of water erosion:* Moderate

*Slope class:* Gently sloping

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Extremely acid to strongly acid throughout, except where the surface layer has been limed

*Parent material:* Residuum weathered from felsic intrusive rocks

*Depth to bedrock:* More than 60 inches

### ***Inclusions***

*Dissimilar inclusions:*

- The well drained Vance, Appling, and Wedowee soils on knolls and in the slightly higher areas
- The poorly drained Wehadkee soils and somewhat poorly drained Chewacla soils along drainageways

*Similar inclusions:*

- Helena soils that have a surface layer of loam or coarse sandy loam

### ***Use and Management***

**Major uses:** Cropland, pasture and hayland, and woodland

#### **Cropland**

*Suitability:* Well suited (fig. 7)

*Management concerns:* Wetness, fertility, and erodibility

*Management measures:*

- An artificial drainage system helps to reduce wetness and improves the productivity of this soil.
- Tilling when the soil is dry helps to reduce clodding and crusting.
- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.
- Terraces and diversions, stripcropping, contour farming, no-till farming, and crop residue management reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management concerns:* Wetness, fertility, and erodibility

*Management measures:*

- Planting wetness-tolerant species in undrained areas helps to improve the productivity of this soil.
- The pasture can be renovated as needed by applying

the proper amounts of lime and fertilizer and by planting suitable seed mixtures.

- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.

- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

### **Woodland**

*Suitability:* Well suited

*Productivity:* Moderately high

*Management concerns:* Competition from undesirable plants

*Management measures:*

- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.
- Planting the appropriate species, as recommended by a forester, helps to maximize productivity and ensure planting success.

### **Urban development**

*Suitability:* Poorly suited

*Management concerns:* Wetness, restricted permeability, shrink-swell potential, low strength, and corrosivity

*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Selecting the highest area of the landscape for building site development and installing an artificial drainage system help to reduce the risk of damage caused by wetness.
- Reinforcing foundations or backfilling with coarse-textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### ***Interpretive Groups***

*Land capability classification:* IIe

*Woodland ordination symbol:* 8A, based on loblolly pine as the indicator species

## **HeC—Helena sandy loam, 6 to 10 percent slopes**

### ***Setting***

*Landscape:* Piedmont uplands

*Landform:* Hill slopes

*Shape of areas:* Long or irregularly shaped





Figure 7.—An area of Helena sandy loam, 2 to 6 percent slopes, which is well suited to row crops and specialty crops, such as broccoli.

*Size of areas:* 5 to 50 acres

### ***Composition***

Helena soil and similar inclusions: 80 percent

Dissimilar inclusions: 20 percent

### ***Typical Profile***

*Surface layer:*

0 to 6 inches—brown sandy loam

*Subsurface layer:*

6 to 11 inches—light yellowish brown fine sandy loam

*Subsoil:*

11 to 21 inches—brown sandy clay loam

21 to 26 inches—reddish yellow clay loam

26 to 40 inches—brown clay that has light brownish gray mottles

40 to 44 inches—light brownish gray clay loam

*Underlying material:*

44 to 65 inches—reddish brown clay loam

### ***Soil Properties and Qualities***

*Depth class:* Very deep

*Drainage class:* Moderately well drained

*Permeability:* Slow

*Available water capacity:* Moderate

*Depth to high water table:* 1.5 to 2.5 feet from January through April

*Shrink-swell potential:* High

*Surface runoff:* Medium

*Hazard of water erosion:* Severe

*Slope class:* Moderately sloping

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Extremely acid to strongly acid throughout, except where the surface layer has been limed

*Parent material:* Residuum weathered from felsic intrusive rocks

*Depth to bedrock:* More than 60 inches

### ***Inclusions***

*Dissimilar inclusions:*

- Random areas of the well drained Vance soils

*Similar inclusions:*

- Helena soils that have a surface layer of loam or coarse sandy loam

### ***Use and Management***

**Major uses:** Cropland, pasture and hayland, and woodland

#### **Cropland**

*Suitability:* Suited

*Management concerns:* Erodibility, wetness, and fertility

*Management measures:*

- Terraces and diversions, stripcropping, contour farming, no-till farming, and crop residue management reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.
- An artificial drainage system helps to reduce wetness and improves the productivity of this soil.
- Tilling when the soil is dry helps to reduce clodding and crusting.
- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.

#### **Pasture and hayland**

*Suitability:* Suited

*Management concerns:* Erodibility, wetness, and fertility

*Management measures:*

- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- Planting wetness-tolerant species in undrained areas helps to improve the productivity of this soil.
- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

#### **Woodland**

*Suitability:* Well suited

*Productivity:* Moderately high

*Management concerns:* Competition from undesirable plants

*Management measures:*

- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.
- Planting the appropriate species, as recommended by a forester, helps to maximize productivity and ensure planting success.

#### **Urban development**

*Suitability:* Poorly suited

*Management concerns:* Wetness, restricted permeability, shrink-swell potential, slope, low strength, and corrosivity

*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Selecting the highest area of the landscape for building site development and installing an artificial drainage system help to reduce the risk of damage caused by wetness.
- Reinforcing foundations or backfilling with coarse-textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Structures should be designed so that they conform to the natural slope of the land or constructed in the less sloping areas.
- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### ***Interpretive Groups***

*Land capability classification:* IIIe

*Woodland ordination symbol:* 8A, based on loblolly pine as the indicator species

## **HrB—Herndon silt loam, 2 to 6 percent slopes**

### ***Setting***

*Landscape:* Piedmont uplands

*Landform:* Broad ridges

*Shape of areas:* Round or irregularly shaped

*Size of areas:* 10 to 120 acres

### ***Composition***

Herndon soil and similar inclusions: 75 percent

Dissimilar inclusions: 25 percent

### **Typical Profile**

#### *Surface layer:*

0 to 8 inches—brownish yellow silt loam

#### *Subsoil:*

8 to 22 inches—brownish yellow clay loam that has red mottles

22 to 34 inches—brownish yellow clay loam that has red and very pale brown mottles

34 to 40 inches—brownish yellow silty clay loam that has red and very pale brown mottles

#### *Underlying material:*

40 to 53 inches—mottled brownish yellow, red, and very pale brown silt loam saprolite

53 to 65 inches—multicolored silt loam saprolite in shades of red, yellow, and white

### **Soil Properties and Qualities**

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* High

*Depth to high water table:* More than 6 feet

*Shrink-swell potential:* Low

*Surface runoff:* Medium

*Hazard of water erosion:* Moderate

*Slope class:* Gently sloping

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Very strongly acid to slightly acid in the A horizon, except where limed, and extremely acid to strongly acid in the B and C horizons

*Parent material:* Residuum weathered from mixed felsic and mafic volcanic rocks

*Depth to bedrock:* More than 60 inches

### **Inclusions**

#### *Dissimilar inclusions:*

- The moderately well drained or somewhat poorly drained Lignum soils in depressions and at the head of drainageways
- Random areas of Nason soils that have soft bedrock at a depth of 40 to 60 inches
- Random areas of Tatum soils that have soft bedrock at a depth of 30 to 60 inches
- Random areas of eroded Herndon soils that have a surface layer of silty clay loam

#### *Similar inclusions:*

- Herndon soils that have a surface layer of loam

### **Use and Management**

**Major uses:** Cropland, pasture and hayland, and woodland

### **Cropland**

*Suitability:* Well suited

*Management concerns:* Fertility and erodibility

*Management measures:*

- Planting perennial grasses and legumes in rotation helps to break up the clayey root zone.
- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.
- Terraces and diversions, stripcropping, contour farming, no-till farming, and crop residue management reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.

### **Pasture and hayland**

*Suitability:* Well suited

*Management concerns:* Fertility and erodibility

*Management measures:*

- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

### **Woodland**

*Suitability:* Well suited

*Productivity:* Moderately high

*Management concerns:* Slight limitations

*Management measures:*

- Planting the appropriate species, as recommended by a forester, helps to maximize productivity and ensure planting success.

### **Urban development**

*Suitability:* Suited

*Management concerns:* Restricted permeability, low strength, and corrosivity

*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Installing the distribution lines of septic systems during dry periods helps to prevent smearing and sealing of trench walls.
- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### ***Interpretive Groups***

*Land capability classification:* IIe

*Woodland ordination symbol:* 8A, based on loblolly pine as the indicator species

## **HrC—Herndon silt loam, 6 to 10 percent slopes**

### ***Setting***

*Landscape:* Piedmont uplands

*Landform:* Hill slopes

*Shape of areas:* Long and narrow to broad or irregularly shaped

*Size of areas:* 10 to 60 acres

### ***Composition***

Herndon soil and similar inclusions: 65 percent

Dissimilar inclusions: 35 percent

### ***Typical Profile***

*Surface layer:*

0 to 4 inches—dark yellowish brown silt loam

*Subsurface layer:*

4 to 10 inches—yellowish brown silt loam

10 to 35 inches—strong brown clay loam

35 to 55 inches—multicolored silty clay loam in shades of strong brown, brownish yellow, and red

*Underlying material:*

55 to 65 inches—multicolored silt loam saprolite in shades of red, yellow, and white

### ***Soil Properties and Qualities***

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* High

*Depth to high water table:* More than 6 feet

*Shrink-swell potential:* Low

*Surface runoff:* Medium

*Hazard of water erosion:* Severe

*Slope class:* Moderately sloping

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Very strongly acid or strongly acid throughout, except where the surface layer has been limed

*Parent material:* Residuum weathered from mixed felsic and mafic volcanic rocks

*Depth to bedrock:* More than 60 inches

### ***Inclusions***

*Dissimilar inclusions:*

- Random areas of Nason soils that have bedrock at a depth of 40 to 60 inches

- Random areas of Tatum soils that have soft bedrock at a depth of 30 to 60 inches
- Herndon soils that contain cobble-sized or larger rock fragments within a depth of 20 inches
- Random areas of eroded Herndon soils that have a surface layer of silty clay loam

*Similar inclusions:*

- Herndon soils that have a surface layer of loam

### ***Use and Management***

**Major uses:** Cropland, pasture and hayland, and woodland

#### **Cropland**

*Suitability:* Suited

*Management concerns:* Erodibility and fertility

*Management measures:*

- Terraces and diversions, stripcropping, contour farming, no-till farming, and crop residue management reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.
- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management concerns:* Fertility and erodibility

*Management measures:*

- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

#### **Woodland**

*Suitability:* Well suited

*Productivity:* Moderately high

*Management concerns:* Slight limitations

*Management measures:*

- Planting the appropriate species, as recommended by a forester, helps to maximize productivity and ensure planting success.

#### **Urban development**

*Suitability:* Suited

*Management concerns:* Restricted permeability, slope, low strength, and corrosivity

*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.

- Installing the distribution lines of septic systems during dry periods helps to prevent smearing and sealing of trench walls.
- Structures should be designed so that they conform to the natural slope of the land or constructed in the less sloping areas.
- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### **Interpretive Groups**

*Land capability classification:* IIIe

*Woodland ordination symbol:* 8A, based on loblolly pine as the indicator species

## **IrB—Iredell loam, 2 to 6 percent slopes**

### **Setting**

*Landscape:* Piedmont uplands

*Landform:* Broad interstream divides and head of drainageways

*Shape of areas:* Rounded or irregularly shaped

*Size of areas:* 8 to 100 acres

### **Composition**

Iredell soil and similar inclusions: 85 percent

Dissimilar inclusions: 15 percent

### **Typical Profile**

*Surface layer:*

0 to 6 inches—dark grayish brown loam

*Subsoil:*

6 to 10 inches—brown loam

10 to 24 inches—dark brown clay

24 to 28 inches—dark brown clay loam that has brownish yellow and strong brown mottles

*Underlying material:*

28 to 53 inches—mottled brownish yellow, light brownish gray, and black loam saprolite

*Bedrock:*

53 to 65 inches—weathered, multicolored, fractured diabase

### **Soil Properties and Qualities**

*Depth class:* Deep

*Drainage class:* Moderately well drained

*Permeability:* Slow

*Available water capacity:* High

*Depth to high water table:* 1 to 2 feet from December through April

*Shrink-swell potential:* Very high

*Surface runoff:* Medium

*Hazard of water erosion:* Moderate

*Slope class:* Gently sloping

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Strongly acid to neutral in the A horizon, moderately acid to neutral in the B horizon, and neutral or slightly alkaline in the C horizon

*Parent material:* Residuum weathered from mafic intrusive rocks

*Depth to bedrock:* 40 to 60 inches to soft bedrock and more than 60 inches to hard bedrock

### **Inclusions**

*Dissimilar inclusions:*

- Soils that are similar to the Iredell soil that have saprolite within a depth of 20 inches
- The poorly drained Picture soils on broad flats and in slight depressions
- Random areas of eroded Iredell soils that have a surface layer of clay loam

*Similar inclusions:*

- Iredell soils that have a surface layer of sandy loam

### **Use and Management**

**Major uses:** Cropland (fig. 8), pasture and hayland, woodland, and urban development

#### **Cropland**

*Suitability:* Suited

*Management concerns:* Erodibility, wetness, and fertility

*Management measures:*

- Terraces and diversions, stripcropping, contour farming, no-till farming, and crop residue management reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.
- An artificial drainage system helps to reduce wetness and improves the productivity of this soil.
- Tilling when the soil is dry helps to reduce clodding and crusting.
- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management concerns:* Erodibility, wetness, and fertility

*Management measures:*

- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.



**Figure 8.—A well managed farm in an area of Iredell loam, 2 to 6 percent slopes. It includes erosion-control structures, a farm pond, and dense vegetation.**

- Planting wetness-tolerant species in undrained areas helps to improve the productivity of this soil.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

#### **Woodland**

*Suitability:* Well suited

*Productivity:* Moderately high

*Management concerns:* Equipment limitation and competition from undesirable plants

*Management measures:*

- Logging during dry periods helps to prevent rutting and root damage resulting from compaction.
- Unsurfaced roads may be impassible during wet periods because of the high content of clay.

- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.
- Planting the appropriate species, as recommended by a forester, helps to maximize productivity and ensure planting success.

#### **Urban development**

*Suitability:* Poorly suited

*Management concerns:* Wetness, restricted permeability, shrink-swell potential, low strength, and corrosivity

*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Selecting the highest area of the landscape for building site development and installing an artificial



drainage system help to reduce the risk of damage caused by wetness.

- Reinforcing foundations or backfilling with coarse-textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel.

### ***Interpretive Groups***

*Land capability classification:* IIe

*Woodland ordination symbol:* 6C, based on loblolly pine as the indicator species

## **IrC—Iredell loam, 6 to 10 percent slopes**

### ***Setting***

*Landscape:* Piedmont uplands

*Landform:* Hill slopes

*Shape of areas:* Long and narrow or irregularly shaped

*Size of areas:* 5 to 150 acres

### ***Composition***

Iredell soil and similar inclusions: 75 percent

Dissimilar inclusions: 25 percent

### ***Typical Profile***

*Surface layer:*

0 to 5 inches—dark grayish brown loam

*Subsoil:*

5 to 20 inches—dark yellowish brown clay

20 to 26 inches—brownish yellow and dark yellowish brown clay

26 to 40 inches—brownish yellow, dark yellowish brown, and very dark grayish brown clay loam

*Underlying material:*

40 to 49 inches—multicolored loam saprolite in shades of brown, yellow, black, and gray

*Bedrock:*

49 to 62 inches—weathered, multicolored, fractured gabbro

### ***Soil Properties and Qualities***

*Depth class:* Deep

*Drainage class:* Moderately well drained

*Permeability:* Slow

*Available water capacity:* High

*Depth to high water table:* 1 to 2 feet from December through April

*Shrink-swell potential:* Very high

*Slope class:* Moderately sloping

*Surface runoff:* Medium

*Hazard of water erosion:* Severe

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Strongly acid to neutral in the A horizon, moderately acid to neutral in the B horizon, and neutral or slightly alkaline in the C horizon

*Parent material:* Residuum weathered from mafic intrusive rocks

*Depth to bedrock:* 40 to 60 inches to soft bedrock and more than 60 inches to hard bedrock

### ***Inclusions***

*Dissimilar inclusions:*

- Soils that are similar to the Iredell soil that have saprolite within a depth of 20 inches
- Soils that are similar to the Iredell soil that contain cobble-sized rock fragments in the surface layer
- Random areas of eroded Iredell soils that have a surface layer of clay loam

*Similar inclusions:*

- Iredell soils that have a surface layer of sandy loam

### ***Use and Management***

**Major uses:** Cropland, pasture and hayland, woodland, and urban development

#### **Cropland**

*Suitability:* Suited

*Management concerns:* Erodibility, wetness, and fertility

*Management measures:*

- Conservation tillage, stripcropping, crop residue management, and sod-based rotations reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.
- An artificial drainage system helps to reduce wetness and improves the productivity of this soil.
- Tilling when the soil is dry helps to reduce clodding and crusting.
- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management concerns:* Wetness, erodibility, and fertility

*Management measures:*

- Planting wetness-tolerant species in undrained areas helps to improve the productivity of this soil.
- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.

- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.

- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

### **Woodland**

*Suitability:* Well suited

*Productivity:* Moderately high

*Management concerns:* High content of clay, competition from undesirable plants, and equipment limitation

*Management measures:*

- Logging during dry periods helps to prevent rutting and root damage resulting from compaction.
- Unsurfaced roads may be impassible during wet periods because of the high content of clay.
- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.
- Planting the appropriate species, as recommended by a forester, helps to maximize productivity and ensure planting success.

### **Urban development**

*Suitability:* Poorly suited

*Management concerns:* Wetness, restricted permeability, shrink-swell potential, low strength, and corrosivity

*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Selecting the highest area of the landscape for building site development and installing an artificial drainage system help to reduce the risk of damage caused by wetness.
- Installing the distribution lines of septic systems during dry periods helps to prevent smearing and sealing of trench walls.
- Reinforcing foundations or backfilling with coarse-textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel.

### **Interpretive Groups**

*Land capability classification:* IIIe

*Woodland ordination symbol:* 6C, based on loblolly pine as the indicator species

## **IuC—Iredell-Urban land-Picture complex, 0 to 10 percent slopes**

### **Setting**

*Landscape:* Piedmont uplands

*Landform:* Iredell—the slightly higher parts of broad ridges and hill slopes; Urban land—the slightly higher parts of broad ridges; Picture—the slightly lower convex parts of broad ridges

*Shape of areas:* Irregularly shaped

*Size of areas:* 50 to 300 acres

### **Composition**

Iredell soil and similar inclusions: 50 percent

Urban land: 30 percent

Picture soil and similar inclusions: 15 percent

Dissimilar inclusions: 5 percent

### **Typical Profile**

#### **Iredell**

*Surface layer:*

0 to 6 inches—dark grayish brown loam

*Subsoil:*

6 to 10 inches—brown loam

10 to 24 inches—dark brown clay

24 to 28 inches—dark brown clay loam that has brownish yellow and strong brown mottles

*Underlying material:*

28 to 53 inches—mottled brownish yellow, light brownish gray, and black loam saprolite

*Bedrock:*

53 to 65 inches—weathered, multicolored, fractured diabase

#### **Picture**

*Surface layer:*

0 to 3 inches—very dark gray loam

3 to 7 inches—very dark grayish brown loam that has strong brown mottles

*Subsoil:*

7 to 17 inches—very dark grayish brown clay loam

17 to 24 inches—dark grayish brown clay

24 to 31 inches—mottled dark grayish brown, light olive brown, and strong brown clay

*Underlying material:*

31 to 49 inches—mottled dark grayish brown, light olive brown, and strong brown sandy loam

*Bedrock:*

49 to 62 inches—weathered, multicolored diabase

### **Soil Properties and Qualities**

#### **Iredell and Picture**

*Depth class:* Deep

*Drainage class:* Iredell—moderately well drained;  
 Picture—poorly drained  
*Permeability:* Iredell—slow; Picture—very slow  
*Available water capacity:* High  
*Depth to high water table:* Iredell—1.0 to 2.0 feet from  
 December through April; Picture—0.5 foot to 1.5  
 feet from November through April  
*Hazard of flooding:* Overland flow for brief periods  
 during high-intensity rainfall  
*Shrink-swell potential:* Very high  
*Surface runoff:* Iredell—medium; Picture—slow  
*Hazard of water erosion:* Iredell—moderate or severe;  
 Picture—none or slight  
*Slope class:* Iredell—gently sloping to strongly sloping;  
 Picture—nearly level or gently sloping  
*Organic matter content:* Iredell—low; Picture—high  
*Natural fertility:* Iredell—low; Picture—moderate  
*Reaction:* Iredell—strongly acid to neutral in the A  
 horizon, moderately acid to neutral in the B horizon,  
 and neutral or slightly alkaline in the C horizon;  
 Picture—very strongly acid to neutral in the A and B  
 horizons and moderately acid to moderately alkaline  
 in the C horizon  
*Parent material:* Residuum weathered from mafic  
 intrusive rocks  
*Depth to bedrock:* 40 to 60 inches to soft bedrock and  
 more than 60 inches to hard bedrock

### **Urban land**

- These areas are covered by roads, parking lots, closely spaced buildings, and other urban structures. Identification of soil series is not feasible.

### **Inclusions**

#### *Dissimilar inclusions:*

- Soils that are similar to the Iredell soil that have saprolite within a depth of 20 inches
- Random areas of Iredell soils that have a surface layer of gravelly loam

#### *Similar inclusions:*

- Iredell soils that have a surface layer of fine sandy loam

### **Use and Management**

**Major uses:** Urban development

#### **Cropland**

*Suitability:* Poorly suited

*Management concerns:*

- Managing areas of this map unit for crop production is difficult because of the limited size of the areas,

intermittent areas of urban land, and areas of highly disturbed soils.

#### **Pasture and hayland**

*Suitability:* Poorly suited

*Management concerns:*

- Managing areas of this map unit for the production of pasture and hay crops is difficult because of the limited size of the areas, intermittent areas of urban land, and areas of highly disturbed soils.

#### **Woodland**

*Suitability:* Poorly suited

*Management concerns:*

- Managing areas of this map unit for timber production is difficult because of the limited size of the areas, intermittent areas of urban land, and areas of highly disturbed soils.

#### **Urban development**

*Suitability:* Poorly suited

*Management concerns:* Iredell—wetness, restricted permeability, shrink-swell potential, low strength, slope, and corrosivity; Picture—wetness, brief periods of overland flow during high-intensity rainfall, restricted permeability, shrink-swell potential, low strength, and corrosivity

*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Selecting the highest area of the landscape for building site development and installing an artificial drainage system help to reduce the risk of damage caused by wetness.
- Installing the distribution lines of septic systems during dry periods helps to prevent smearing and sealing of trench walls.
- Reinforcing foundations or backfilling with coarse-textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.
- Structures should be designed so that they conform to the natural slope of the land.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### **Interpretive Groups**

*Land capability classification:* Iredell—IIIe; Urban land—VIIIs; Picture—IVw

*Woodland ordination symbol:* None assigned

## **LmB—Lignum silt loam, 2 to 6 percent slopes**

### **Setting**

*Landscape:* Piedmont uplands

*Landform:* Broad interstream divides, slight depressions, and head of drainageways

*Shape of areas:* Rounded or irregularly shaped

*Size of areas:* 10 to 150 acres

### **Composition**

Lignum soil and similar inclusions: 85 percent

Dissimilar inclusions: 15 percent

### **Typical Profile**

*Surface layer:*

0 to 10 inches—light yellowish brown silt loam

*Subsoil:*

10 to 14 inches—light yellowish brown silt loam

14 to 20 inches—light yellowish brown silty clay loam that has strong brown and gray mottles

20 to 34 inches—brownish yellow silty clay loam that has yellowish brown and gray mottles

34 to 39 inches—brownish yellow silt loam that has light gray and strong brown mottles

*Underlying material:*

39 to 46 inches—multicolored silt loam saprolite in shades of brown, yellow, and gray

*Bedrock:*

46 to 62 inches—weathered, multicolored, fractured schist

### **Soil Properties and Qualities**

*Depth class:* Deep

*Drainage class:* Moderately well drained or somewhat poorly drained

*Permeability:* Very slow

*Available water capacity:* High

*Depth to high water table:* 1.0 to 2.5 feet from December through May

*Shrink-swell potential:* Moderate

*Surface runoff:* Medium

*Hazard of water erosion:* Moderate

*Slope class:* Gently sloping

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Very strongly acid or strongly acid throughout, except where the surface layer has been limed

*Parent material:* Residuum weathered from felsic volcanic rocks

*Depth to bedrock:* 40 to 60 inches to soft bedrock and more than 60 inches to hard bedrock

### **Inclusions**

*Dissimilar inclusions:*

- Random areas of the well drained Herndon soils
- Random areas of soils that are similar to the Lignum soil that have hard bedrock at a depth of 20 to 40 inches
- Random areas of Lignum soils that have a surface layer of gravelly loam

*Similar inclusions:*

- Lignum soils that have a surface layer of fine sandy loam or loam

### **Use and Management**

**Major uses:** Cropland, pasture and hayland, woodland, and urban development

#### **Cropland**

*Suitability:* Well suited

*Management concerns:* Wetness, fertility, and erodibility

*Management measures:*

- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.
- An artificial drainage system helps to reduce wetness and improves the productivity of this soil.
- Tilling when the soil is dry helps to reduce clodding and crusting.
- Planting perennial grasses and legumes in rotation helps to break up the clayey root zone.
- Terraces and diversions, stripcropping, contour farming, no-till farming, and crop residue management reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management concerns:* Wetness, erodibility, and fertility

*Management measures:*

- Planting wetness-tolerant species in undrained areas helps to improve the productivity of this soil.
- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

#### **Woodland**

*Suitability:* Well suited

*Productivity:* Moderately high

**Management concerns:** Seedling survival and competition from undesirable plants

**Management measures:**

- Special site preparation, such as harrowing and bedding, helps to establish seedlings, reduces mortality, and increases early seedling growth.
- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.
- Planting the appropriate species, as recommended by a forester, helps to maximize productivity and ensure planting success.

### **Urban development**

**Suitability:** Poorly suited

**Management concerns:** Wetness, restricted permeability, low strength, and corrosivity

**Management measures:**

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Selecting the highest area of the landscape for building site development and installing an artificial drainage system help to reduce the risk of damage caused by wetness.
- Installing the distribution lines of septic systems during dry periods helps to prevent smearing and sealing of trench walls.
- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### **Interpretive Groups**

**Land capability classification:** IIe

**Woodland ordination symbol:** 9W, based on loblolly pine as the indicator species

## **MaB—Mayodan sandy loam, 2 to 6 percent slopes**

### **Setting**

**Landscape:** Piedmont uplands

**Landform:** Ridges and convex knolls

**Shape of areas:** Rounded or irregularly shaped

**Shape of areas:** 5 to 30 acres

### **Composition**

Mayodan soil and similar inclusions: 85 percent

Dissimilar inclusions: 15 percent

### **Typical Profile**

**Surface layer:**

0 to 9 inches—yellowish brown sandy loam

**Subsoil:**

9 to 15 inches—brownish yellow clay loam that has yellowish red mottles

15 to 28 inches—strong brown clay loam that has brownish yellow and yellowish red mottles

28 to 35 inches—strong brown clay that has brownish yellow and yellowish red mottles

35 to 44 inches—yellowish brown clay loam that has strong brown, yellowish red, and light gray mottles

**Underlying material:**

44 to 65 inches—multicolored sandy clay loam saprolite in shades of red, brown, and white

**Bedrock:**

65 to 75 inches—weathered, multicolored sandstone

### **Soil Properties and Qualities**

**Depth class:** Very deep

**Drainage class:** Well drained

**Permeability:** Moderate

**Available water capacity:** High

**Depth to high water table:** More than 6 feet

**Shrink-swell potential:** Moderate

**Surface runoff:** Medium

**Hazard of water erosion:** Moderate

**Slope class:** Gently sloping

**Organic matter content:** Low

**Natural fertility:** Low

**Reaction:** Very strongly acid to moderately acid in the A horizon and the upper part of the B horizon, except where limed, and very strongly acid or strongly acid in the lower part of the B horizon and in the C horizon

**Parent material:** Residuum weathered from interbedded sedimentary rocks

**Depth to bedrock:** More than 60 inches

### **Inclusions**

**Dissimilar inclusions:**

- The moderately well drained or somewhat poorly drained Creedmoor soils in the slightly lower landscape positions
- Random areas of eroded Mayodan soils that have a surface layer of clay loam

**Similar inclusions:**

- Mayodan soils that have a surface layer of loam

### **Use and Management**

**Major uses:** Cropland, pasture and hayland, woodland and urban development

#### **Cropland**

**Suitability:** Well suited

**Management concerns:** Fertility and erodibility

**Management measures:**

- Applying lime and fertilizer according to

recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.

- Terraces and diversions, stripcropping, contour farming, no-till farming, and crop residue management reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management concerns:* Fertility and erodibility

*Management measures:*

- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

#### **Woodland**

*Suitability:* Well suited

*Productivity:* High

*Management concerns:* Competition from undesirable plants

*Management measures:*

- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.
- Planting the appropriate species, as recommended by a forester, helps to maximize productivity and ensure planting success.

#### **Urban development**

*Suitability:* Suited

*Management concerns:* Restricted permeability, shrink-swell potential, low strength, and corrosivity

*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Installing the distribution lines of septic systems during dry periods helps to prevent smearing and sealing of trench walls.
- Reinforcing foundations or backfilling with coarse-textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### ***Interpretive Groups***

*Land capability classification:* IIe

*Woodland ordination symbol:* 9A, based on loblolly pine as the indicator species

### **NaB—Nason gravelly loam, 2 to 6 percent slopes**

#### ***Setting***

*Landscape:* Piedmont uplands

*Landform:* Narrow ridges

*Shape of areas:* Long or irregularly shaped

*Size of areas:* 10 to 75 acres

#### ***Composition***

Nason soil and similar inclusions: 75 percent

Dissimilar inclusions: 25 percent

#### ***Typical Profile***

*Surface layer:*

0 to 7 inches—grayish brown gravelly loam

*Subsurface layer:*

7 to 12 inches—yellowish brown loam

*Subsoil:*

12 to 24 inches—strong brown clay loam

24 to 32 inches—yellowish red clay

32 to 37 inches—strong brown gravelly silty clay loam

*Underlying material:*

37 to 42 inches—multicolored gravelly silt loam saprolite in shades of red, brown, and white

*Bedrock:*

42 to 50 inches—weathered, multicolored, fractured schist

### ***Soil Properties and Qualities***

*Depth class:* Deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* Moderate

*Depth to high water table:* More than 6 feet

*Shrink-swell potential:* Moderate

*Surface runoff:* Medium

*Hazard of water erosion:* Moderate

*Slope class:* Gently sloping

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Very strongly acid or strongly acid throughout, except where the surface layer has been lined

*Parent material:* Residuum weathered from felsic volcanic rocks



*Depth to bedrock:* 40 to 60 inches to soft bedrock and more than 60 inches to hard bedrock

### ***Inclusions***

*Dissimilar inclusions:*

- The moderately well drained or somewhat poorly drained Lignum soils in depressions and at the head of drainageways
- Random areas of the slowly permeable Enon soils that have a high shrink-swell potential
- Random areas of Herndon soils that have bedrock below a depth of 60 inches
- Random areas of soils that are similar to the Enon soil that have saprolite within a depth of 20 inches
- Nason soils that have cobbles, stones, or boulders on the surface, especially in the area of Bowling's Mountain
- Random areas of Nason soils that do not have a gravelly surface layer

*Similar inclusions:*

- Nason soils that have a surface layer of gravelly sandy loam

### ***Use and Management***

**Major uses:** Cropland, pasture and hayland, and woodland

#### **Cropland**

*Suitability:* Well suited

*Management concerns:* Fertility and erodibility

*Management measures:*

- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.
- Terraces and diversions, stripcropping, contour farming, no-till farming, and crop residue management reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management concerns:* Fertility and erodibility

*Management measures:*

- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

#### **Woodland**

*Suitability:* Well suited

*Productivity:* Moderately high

*Management concerns:* Competition from undesirable plants

*Management measures:*

- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.
- Planting the appropriate species, as recommended by a forester, helps to maximize productivity and ensure planting success.

#### **Urban development**

*Suitability:* Suited

*Management concerns:* Depth to bedrock, restricted permeability, shrink-swell potential, low strength, and corrosivity

*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Areas of included deeper soils may be better suited to septic tank absorption fields.
- Installing the distribution lines of septic systems during dry periods helps to prevent smearing and sealing of trench walls.
- Reinforcing foundations or backfilling with coarse-textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### ***Interpretive Groups***

*Land capability classification:* IIe

*Woodland ordination symbol:* 8A, based on loblolly pine as the indicator species

## **NaC—Nason gravelly loam, 6 to 10 percent slopes**

### ***Setting***

*Landscape:* Piedmont uplands

*Landform:* Narrow ridges and hill slopes

*Shape of areas:* Long or irregularly shaped

*Size of areas:* 10 to 75 acres

### ***Composition***

Nason soil and similar inclusions: 85 percent

Dissimilar inclusions: 15 percent

### **Typical Profile**

*Surface layer:*

0 to 2 inches—brown gravelly loam

*Subsurface layer:*

2 to 11 inches—brownish yellow gravelly silt loam

*Subsoil:*

11 to 16 inches—reddish yellow silty clay loam

16 to 31 inches—strong brown silty clay loam

31 to 39 inches—reddish yellow silt loam

*Underlying material:*

39 to 52 inches—multicolored gravelly silt loam  
saprolite in shades of red and yellow

*Bedrock:*

52 to 62 inches—weathered, multicolored, fractured  
schist

### **Soil Properties and Qualities**

*Depth class:* Deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* Moderate

*Depth to high water table:* More than 6 feet

*Shrink-swell potential:* Moderate

*Surface runoff:* Medium

*Hazard of water erosion:* Severe

*Slope class:* Moderately sloping

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Very strongly acid or strongly acid throughout,  
except where the surface layer has been limed

*Parent material:* Residuum weathered from felsic  
volcanic rocks

*Depth to bedrock:* 40 to 60 inches to soft bedrock and  
more than 60 inches to hard bedrock

### **Inclusions**

*Dissimilar inclusions:*

- Random areas of the well drained Herndon soils
- Random areas of the slowly permeable Enon soils that have a high shrink-swell potential
- Random areas of Herndon soils that have bedrock below a depth of 60 inches
- Nason soils that have cobbles, stones, or boulders on the surface, especially in the area of Bowling's Mountain (fig. 9)
- Random areas of Nason soils that do not have a gravelly surface layer

*Similar inclusions:*

- Nason soils that have a surface layer of gravelly sandy loam

### **Use and Management**

**Major uses:** Cropland, pasture and hayland, and woodland

### **Cropland**

*Suitability:* Suited

*Management concerns:* Fertility and erodibility

*Management measures:*

- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.
- Conservation tillage, stripcropping, crop residue management, and sod-based rotations reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.

### **Pasture and hayland**

*Suitability:* Well suited

*Management concerns:* Fertility and erodibility

*Management measures:*

- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

### **Woodland**

*Suitability:* Well suited

*Productivity:* Moderately high

*Management concerns:* Competition from undesirable plants

*Management measures:*

- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.
- Planting the appropriate species, as recommended by a forester, helps to maximize productivity and ensure planting success.

### **Urban development**

*Suitability:* Suited

*Management concerns:* Slope, depth to bedrock, restricted permeability, shrink-swell potential, low strength, and corrosivity

*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Installing the distribution lines of septic systems during dry periods helps to prevent smearing and sealing of trench walls.
- Distribution lines should be installed on the contour.
- Areas of included deeper soils may be better suited to septic tank absorption fields.



**Figure 9.—Boulders on the surface of Nason soils in an area of Bowling's Mountain are a limitation affecting cropland, pasture and hayland, and woodland.**

- Reinforcing foundations or backfilling with coarse-textured material helps to strengthen buildings and

- prevents damage caused by shrinking and swelling.
- Providing sand and gravel and compacting roadbeds

improve soil strength on sites for local roads and streets.

- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### ***Interpretive Groups***

*Land capability classification:* IIIe

*Woodland ordination symbol:* 8A, based on loblolly pine as the indicator species

## **NaE—Nason gravelly loam, 10 to 25 percent slopes**

### ***Setting***

*Landscape:* Piedmont uplands

*Landform:* Narrow hill slopes adjacent to flood plains and drainageways

*Shape of areas:* Long and irregularly shaped

*Size of areas:* 10 to 100 acres

### ***Composition***

Nason soil and similar inclusions: 90 percent

Dissimilar inclusions: 10 percent

### ***Typical Profile***

*Surface layer:*

0 to 8 inches—grayish brown gravelly loam

*Subsurface layer:*

8 to 11 inches—yellowish brown loam

*Subsoil:*

11 to 24 inches—strong brown clay loam

24 to 32 inches—yellowish red clay loam

32 to 40 inches—yellowish red clay loam that has brown mottles

*Bedrock:*

40 to 62 inches—weathered, multicolored, fractured schist

### ***Soil Properties and Qualities***

*Depth class:* Deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* Moderate

*Depth to high water table:* More than 6 feet

*Shrink-swell potential:* Moderate

*Surface runoff:* Rapid

*Hazard of water erosion:* Very severe

*Slope class:* Strongly sloping or moderately steep

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Very strongly acid or strongly acid throughout, except where the surface layer has been limed

*Parent material:* Residuum weathered from felsic volcanic rocks

*Depth to bedrock:* 40 to 60 inches to soft bedrock and more than 60 inches to hard bedrock

### ***Inclusions***

*Dissimilar inclusions:*

- Nason soils that have cobbles, stones, or boulders on the surface, especially in the area of Bowling's Mountain
- Random areas of Nason soils that do not have a gravelly surface layer
- Random areas of soils that have soft bedrock within a depth of 40 inches

*Similar inclusions:*

- Nason soils that have a surface layer of gravelly sandy loam

### ***Use and Management***

**Major uses:** Pasture and woodland

#### **Cropland**

*Suitability:* Poorly suited

*Management concerns:* Erodibility, equipment limitation, and fertility

*Management measures:*

- Conservation tillage, stripcropping, crop residue management, and sod-based rotations reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.
- Managing this soil for cultivated crops is difficult because the slope limits the use of equipment.
- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.

#### **Pasture and hayland**

*Suitability:* Suited

*Management concerns:* Fertility, erodibility, and equipment limitation

*Management measures:*

- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- The use of equipment may be limited by the slope in the steeper areas of the map unit.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

#### **Woodland**

*Suitability:* Suited

*Productivity:* Moderately high

**Management concerns:** Erodibility, equipment limitation, and seedling survival

**Management measures:**

- Installing broad-based dips, water bars, and culverts helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to reduce the hazard of erosion.
- Constructing roads, fire lanes, and skid trails on the contour helps to overcome the slope.
- Replanting may be necessary on warm, south-facing slopes because of limited soil moisture.

### **Urban development**

**Suitability:** Poorly suited

**Management concerns:** Slope, low strength, and corrosivity

**Management measures:**

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- The slope is a severe limitation affecting urban development.
- Providing sand and gravel, compacting roadbeds, and designing roads so that they conform to the natural slope of the land improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### **Interpretive Groups**

**Land capability classification:** IVe

**Woodland ordination symbol:** 7R, based on loblolly pine as the indicator species

## **NaF—Nason gravelly loam, 25 to 50 percent slopes**

### **Setting**

**Landscape:** Piedmont uplands

**Landform:** Narrow hill slopes adjacent to flood plains and drainageways

**Shape of areas:** Narrow to irregularly shaped

**Size of areas:** 10 to 50 acres

### **Composition**

Nason soil and similar inclusions: 75 percent

Dissimilar inclusions: 25 percent

### **Typical Profile**

**Surface layer:**

0 to 2 inches—very dark grayish brown gravelly loam

**Subsurface layer:**

2 to 5 inches—brown gravelly loam

**Subsoil:**

5 to 15 inches—yellowish brown silty clay loam

15 to 26 inches—yellowish brown clay loam

26 to 32 inches—brownish yellow silty clay loam

**Underlying material:**

32 to 40 inches—multicolored gravelly silt loam saprolite in shades of red, yellow, and white

**Bedrock:**

40 to 62 inches—weathered, multicolored, fractured schist

### **Soil Properties and Qualities**

**Depth class:** Deep

**Drainage class:** Well drained

**Permeability:** Moderate

**Available water capacity:** Moderate

**Depth to high water table:** More than 6 feet

**Shrink-swell potential:** Moderate

**Surface runoff:** Rapid

**Hazard of water erosion:** Very severe

**Slope class:** Steep

**Organic matter content:** Low

**Natural fertility:** Low

**Surface runoff:** Rapid

**Reaction:** Very strongly acid or strongly acid throughout, except where the surface layer has been limed

**Parent material:** Residuum weathered from felsic volcanic rocks

**Depth to bedrock:** 40 to 60 inches to soft bedrock and more than 60 inches to hard bedrock

### **Inclusions**

**Dissimilar inclusions:**

- Nason soils that have cobbles, stones, or boulders on the surface, especially in the area of Bowling's Mountain
- Random areas of Nason soils that do not have a gravelly surface layer

**Similar inclusions:**

- Nason soils that have a surface layer of gravelly sandy loam

### **Use and Management**

**Major uses:** Woodland

#### **Cropland**

**Suitability:** Unsited

**Management concerns:** Erodibility, equipment limitation, and fertility

**Management measures:**

- This soil has severe limitations affecting crop production.
- A better suited soil should be selected.

**Pasture and hayland***Suitability:* Poorly suited*Management concerns:* Equipment limitation, erodibility, and fertility*Management measures:*

- Equipment should be used with caution because of the slope.
- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

**Woodland***Suitability:* Suited*Productivity:* Moderately high*Management concerns:* Erodibility, equipment limitation, and seedling survival*Management measures:*

- Installing broad-based dips, water bars, and culverts helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to reduce the hazard of erosion.
- Constructing roads, fire lanes, and skid trails on the contour helps to overcome the slope.
- Replanting may be necessary on warm, south-facing slopes because of limited soil moisture.

**Urban development***Suitability:* Poorly suited*Management concerns:* Slope, low strength, and corrosivity*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- The slope is a severe limitation affecting urban development.
- Providing sand and gravel, compacting roadbeds, and designing roads so that they conform to the natural slope of the land improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

**Interpretive Groups***Land capability classification:* VIIe*Woodland ordination symbol:* 7R, based on loblolly pine as the indicator species**PaE—Pacolet sandy loam, 10 to 25 percent slopes****Setting***Landscape:* Piedmont uplands*Landform:* Hill slopes adjacent to flood plains and drainageways*Shape of areas:* Long and narrow or irregularly shaped*Size of areas:* 10 to 70 acres**Composition**

Pacolet soil and similar inclusions: 85 percent

Dissimilar inclusions: 15 percent

**Typical Profile***Surface layer:*

0 to 8 inches—reddish brown sandy loam

*Subsoil:*

8 to 25 inches—red clay

25 to 40 inches—red clay loam

*Underlying material:*

40 to 65 inches—red loam saprolite

**Soil Properties and Qualities***Depth class:* Very deep*Drainage class:* Well drained*Permeability:* Moderate*Available water capacity:* High*Depth to high water table:* More than 6 feet*Shrink-swell potential:* Low*Surface runoff:* Rapid*Hazard of water erosion:* Very severe*Slope class:* Strongly sloping or moderately steep*Organic matter content:* Low*Natural fertility:* Low*Reaction:* Very strongly acid to slightly acid in the A horizon, except where limed, and very strongly acid to moderately acid in the B and C horizons*Parent material:* Residuum weathered from felsic intrusive rocks*Depth to bedrock:* More than 60 inches**Inclusions***Dissimilar inclusions:*

- Random areas of Cecil soils that have saprolite below a depth of 40 inches
- Random areas of Tatum soils that have a higher content of silt in the subsoil than the Pacolet soil
- Pacolet soils that have cobbles or widely scattered stones or boulders on the surface

*Similar inclusions:*

- Pacolet soils that have a surface layer of loam or clay loam



### ***Use and Management***

**Major uses:** Pasture and hayland and woodland

#### **Cropland**

*Suitability:* Poorly suited

*Management concerns:* Equipment limitation, erodibility, and fertility

*Management measures:*

- Managing this soil for cultivated crops is difficult because the slope limits the use of equipment.
- Conservation tillage, stripcropping, crop residue management, and sod-based rotations reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.
- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.

#### **Pasture and hayland**

*Suitability:* Suited

*Management concerns:* Equipment limitation, erodibility, and fertility

*Management measures:*

- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- The use of equipment may be limited by the slope in the steeper areas of the map unit.
- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

#### **Woodland**

*Suitability:* Well suited

*Productivity:* Moderately high

*Management concerns:* Erodibility and equipment limitation

*Management measures:*

- Installing broad-based dips, water bars, and culverts helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to reduce the hazard of erosion.
- Constructing roads, fire lanes, and skid trails on the contour helps to overcome the slope.
- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.

#### **Urban development**

*Suitability:* Poorly suited

*Management concerns:* Slope, restricted permeability, low strength, and corrosivity

*Management measures:*

- The slope is a severe limitation affecting urban development.
- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Providing sand and gravel, compacting roadbeds, and designing roads so that they conform to the natural slope of the land improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### ***Interpretive Groups***

*Land capability classification:* VIe

*Woodland ordination symbol:* 8R, based on loblolly pine as the indicator species

## **PaF—Pacolet sandy loam, 25 to 50 percent slopes**

### ***Setting***

*Landscape:* Piedmont uplands

*Landform:* Hill slopes adjacent to flood plains and drainageways

*Shape of areas:* Long and narrow or irregularly shaped

*Size of areas:* 10 to 70 acres

### ***Composition***

Pacolet soil and similar inclusions: 70 percent

Dissimilar inclusions: 30 percent

### ***Typical Profile***

*Surface layer:*

0 to 4 inches—yellowish red sandy loam

4 to 10 inches—dark yellowish brown sandy loam

*Subsoil:*

10 to 26 inches—red clay loam

26 to 34 inches—yellowish red loam

*Underlying material:*

34 to 65 inches—strong brown fine sandy loam saprolite

### ***Soil Properties and Qualities***

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* Moderate

*Depth to high water table:* More than 6 feet

*Shrink-swell potential:* Low

*Surface runoff:* Rapid

*Hazard of water erosion:* Very severe

*Slope class:* Steep

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Very strongly acid to slightly acid in the A horizon, except where limed, and very strongly acid to moderately acid in the B and C horizons

*Parent material:* Residuum weathered from felsic intrusive rocks

*Depth to bedrock:* More than 60 inches

### ***Inclusions***

*Dissimilar inclusions:*

- Random areas of Tatum soils that have soft bedrock at a depth of 40 to 60 inches
- Random areas of soils that have soft bedrock at a depth of 20 to 40 inches
- Pacolet soils that have cobbles or widely scattered stones or boulders on the surface

*Similar inclusions:*

- Pacolet soils that have a surface layer of loam or clay loam

### ***Use and Management***

**Major uses:** Woodland

#### **Cropland**

*Suitability:* Unsited

*Management concerns:* Equipment limitation and erodibility

*Management measures:*

- This soil has severe limitations affecting crop production.
- A better suited soil should be selected.

#### **Pasture and hayland**

*Suitability:* Poorly suited

*Management concerns:* Equipment limitation, erodibility, and fertility

*Management measures:*

- This soil has severe limitations affecting the production of hay and pasture crops.
- A better suited soil should be selected.

#### **Woodland**

*Suitability:* Suited

*Productivity:* Moderately high

*Management concerns:* Erodibility and equipment limitation

*Management measures:*

- Installing broad-based dips, water bars, and culverts helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to reduce the hazard of erosion.
- Constructing roads, fire lanes, and skid trails on the contour helps to overcome the slope.
- Planting the appropriate species, as recommended by

a forester, helps to maximize productivity and ensure planting success.

### **Urban development**

*Suitability:* Poorly suited

*Management concerns:* Slope, restricted permeability, low strength, and corrosivity

*Management measures:*

- The slope is a severe limitation affecting urban development.
- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Providing sand and gravel, compacting roadbeds, and designing roads so that they conform to the natural slope of the land improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### ***Interpretive Groups***

*Land capability classification:* VIIe

*Woodland ordination symbol:* 8R, based on loblolly pine as the indicator species

## **PcA—Picture loam, 0 to 3 percent slopes**

### ***Setting***

*Landscape:* Piedmont uplands

*Landform:* Broad upland flats and interstream divides

*Shape of areas:* Rounded or irregularly shaped

*Size of areas:* 75 to 500 acres

### ***Composition***

Picture soil and similar inclusions: 80 percent

Dissimilar inclusions: 20 percent

### ***Typical Profile***

*Surface layer:*

0 to 3 inches—very dark gray loam

3 to 7 inches—very dark grayish brown loam that has strong brown mottles

*Subsoil:*

7 to 17 inches—very dark grayish brown clay loam

17 to 24 inches—dark grayish brown clay

24 to 31 inches—mottled dark grayish brown, light olive brown, and strong brown clay

*Underlying material:*

31 to 49 inches—mottled dark grayish brown, light olive brown, and strong brown sandy loam saprolite

*Bedrock:*

49 to 62 inches—weathered, multicolored diabase

### ***Soil Properties and Qualities***

*Depth class:* Deep

*Drainage class:* Poorly drained  
*Permeability:* Very slow  
*Available water capacity:* High  
*Depth to high water table:* 0.5 foot to 1.5 feet from November through April  
*Hazard of flooding:* Overland flow for brief periods during high-intensity rainfall  
*Shrink-swell potential:* Very high  
*Surface runoff:* Slow  
*Hazard of water erosion:* None or slight  
*Slope class:* Nearly level  
*Organic matter content:* High  
*Natural fertility:* Moderate  
*Reaction:* Very strongly acid to neutral in the A and B horizons and moderately acid to slightly alkaline in the C horizon  
*Parent material:* Residuum weathered from mafic intrusive rocks  
*Depth to bedrock:* 40 to 60 inches to soft bedrock and more than 60 inches to hard bedrock

### ***Inclusions***

#### *Dissimilar inclusions:*

- The moderately well drained or somewhat poorly drained Iredell soils in the slightly higher landscape positions
- Random areas of Picture soils that have a surface layer of clay loam
- Random areas of Picture soils that have more clay or less clay in the subsoil than the Picture soil

#### *Similar inclusions:*

- Picture soils that have a surface layer of fine sandy loam

### ***Use and Management***

**Major uses:** Pasture and hayland, woodland, and urban development

#### **Cropland**

*Suitability:* Poorly suited

*Management concerns:* Wetness and overland flow during periods of high-intensity rainfall

#### *Management measures:*

- An artificial drainage system helps to reduce wetness and improves the productivity of this soil.
- Tilling when the soil is dry helps to reduce clodding and crusting.
- Terraces and diversions, no-till farming, and crop residue management reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.

#### **Pasture and hayland**

*Suitability:* Suited

*Management concerns:* Wetness and overland flow during periods of high-intensity rainfall

#### *Management measures:*

- Planting wetness-tolerant species in undrained areas helps to improve the productivity of this soil.
- Grazing only when the soil is dry and avoiding overgrazing help to prevent compaction and a rough surface and increase productivity.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

#### **Woodland**

*Suitability:* Poorly suited

*Productivity:* Moderately high

*Management concerns:* Equipment limitation, seedling survival, and competition from undesirable plants

#### *Management measures:*

- Using standard wheeled and tracked equipment only during dry periods helps to prevent rutting and compaction.
- Unsurfaced roads may be impassible during wet periods because of the high content of clay.
- Preparing a seedbed helps to establish seedlings and increases the survival rate.
- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.
- Planting the appropriate species, as recommended by a forester, helps to maximize productivity and ensure planting success.

#### **Urban development**

*Suitability:* Poorly suited

*Management concerns:* Wetness, brief periods of overland flow, restricted permeability, shrink-swell potential, low strength, and corrosivity

#### *Management measures:*

- Managing this soil for sanitary facilities is severely difficult.
- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Selecting the highest area of the landscape for building site development and installing an artificial drainage system help to reduce the risk of damage caused by wetness.
- Reinforcing foundations or backfilling with coarse-textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### ***Interpretive Groups***

*Land capability classification:* IVw

*Woodland ordination symbol:* 7W, based on loblolly pine as the indicator species

## **PnD—Pinkston loamy sand, 10 to 20 percent slopes**

### ***Setting***

*Landscape:* Piedmont uplands

*Landform:* Narrow hill slopes

*Shape of areas:* Long and narrow or irregularly shaped

*Size of areas:* 5 to 50 acres

### ***Composition***

Pinkston soil and similar inclusions: 85 percent

Dissimilar inclusions: 15 percent

### ***Typical Profile***

*Surface layer:*

0 to 6 inches—brown loamy sand

*Subsurface layer:*

6 to 13 inches—brownish yellow sandy loam

*Subsoil:*

13 to 24 inches—70 percent yellowish brown sandy loam and 30 percent strong brown clay loam

*Underlying material:*

24 to 32 inches—multicolored sandy loam saprolite in shades of brown, yellow, and white

*Bedrock:*

32 inches—unweathered arkosic sandstone

### ***Soil Properties and Qualities***

*Depth class:* Moderately deep

*Drainage class:* Well drained

*Permeability:* Moderately rapid

*Available water capacity:* Moderate

*Depth to high water table:* More than 6 feet

*Shrink-swell potential:* Low

*Surface runoff:* Rapid

*Hazard of water erosion:* Very severe

*Slope class:* Strongly sloping or moderately steep

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Very strongly acid or strongly acid throughout, except where the surface layer has been limed

*Parent material:* Residuum weathered from interbedded sedimentary rocks

*Depth to bedrock:* 20 to 40 inches to hard bedrock

### ***Inclusions***

*Dissimilar inclusions:*

- Pinkston soils that have cobbles or widely scattered stones or boulders on the surface

- The moderately well drained or somewhat poorly drained Creedmoor soils at the outer edge of map units
- Random areas of soils that are similar to the Pinkston soil that have hard bedrock below a depth of 60 inches
- Random areas of soils that are similar to the Pinkston soil that contain cobble-sized rock fragments within a depth of 20 inches
- Random areas of eroded Pinkston soils that have a surface layer of loam or sandy clay loam
- Random areas of a deep clayey soil in the less sloping landscape positions

*Similar inclusions:*

- Pinkston soils that have a surface layer of sandy loam

### ***Use and Management***

**Major uses:** Woodland

#### **Cropland**

*Suitability:* Poorly suited

*Management concerns:* Equipment limitation, erodibility, and fertility

*Management measures:*

- Managing this soil for cultivated crops is difficult because the slope limits the use of equipment.
- Conservation tillage, crop residue management, stripcropping, and sod-based rotations reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.
- The varying length, steepness, and direction of slope limit the use of structural erosion-control measures.
- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.

#### **Pasture and hayland**

*Suitability:* Suited

*Management concerns:* Fertility, erodibility, and equipment limitation

*Management measures:*

- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.
- The use of equipment may be limited by the slope in the steeper areas of the map unit.

#### **Woodland**

*Suitability:* Poorly suited

*Productivity:* Low

*Management concerns:* Seedling survival, erodibility, equipment limitation, and windthrow hazard

*Management measures:*

- Planting seedlings during wet, cool seasons ensures plant survival.
- Establishing permanent plant cover on roads and landings after logging operations helps to reduce the hazard of erosion and prevent the siltation of streams.
- Constructing roads, fire lanes, and skid trails on the contour helps to overcome the slope.
- Periodically harvesting windthrown trees that result from high winds and a limited rooting depth can increase productivity.

### **Urban development**

*Suitability:* Poorly suited

*Management concerns:* Depth to bedrock, slope, and corrosivity

*Management measures:*

- The slope is a severe limitation affecting urban development.
- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Areas of included deeper soils may be better suited to septic tank absorption fields.
- The distribution lines of septic systems should be installed on the contour.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete.

### **Interpretive Groups**

*Land capability classification:* VIe

*Woodland ordination symbol:* 3D, based on loblolly pine as the indicator species

## **RwD—Rion-Wateree-Wedowee complex, 8 to 15 percent slopes**

### **Setting**

*Landscape:* Piedmont uplands

*Landform:* Rion—the upper and middle parts of hill slopes; Wateree—the lower slopes; Wedowee—hill slopes

*Shape of areas:* Long and narrow or irregularly shaped

*Size of areas:* 8 to 15 acres

### **Composition**

Rion soil and similar inclusions: 35 percent

Wateree soil and similar inclusions: 30 percent

Wedowee soil and similar inclusions: 20 percent

Dissimilar inclusions: 15 percent

## **Typical Profile**

### **Rion**

*Surface layer:*

0 to 5 inches—very dark grayish brown sandy loam

5 to 8 inches—brown sandy loam

*Subsurface layer:*

8 to 16 inches—brownish yellow sandy loam

*Subsoil:*

16 to 26 inches—yellowish brown clay loam

26 to 34 inches—yellowish brown sandy clay loam

*Underlying material:*

34 to 65 inches—multicolored sandy clay loam saprolite in shades of brown, yellow, and white

### **Wateree**

*Surface layer:*

0 to 3 inches—very dark grayish brown sandy loam

*Subsoil:*

3 to 25 inches—light yellowish brown sandy loam

25 to 39 inches—brownish yellow sandy loam

*Bedrock:*

39 to 50 inches—weathered, multicolored granite

50 inches—unweathered granite

### **Wedowee**

*Surface layer:*

0 to 5 inches—dark brown sandy loam

*Subsurface layer:*

5 to 10 inches—brownish yellow sandy loam

*Subsoil:*

10 to 16 inches—strong brown clay loam

16 to 35 inches—strong brown sandy clay

*Underlying material:*

35 to 62 inches—multicolored sandy loam saprolite in shades of red, brown, and yellow

## **Soil Properties and Qualities**

*Depth class:* Rion and Wedowee—very deep;

Wateree—moderately deep

*Drainage class:* Well drained

*Permeability:* Rion and Wedowee—moderate;

Wateree—moderately rapid

*Available water capacity:* Moderate

*Depth to high water table:* More than 6 feet

*Shrink-swell potential:* Low

*Surface runoff:* Medium or rapid

*Hazard of water erosion:* Severe

*Slope class:* Strongly sloping

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Rion—very strongly acid to slightly acid throughout, except where the surface layer has been limed; Wateree—extremely acid to moderately

acid throughout, except where the surface layer has been limed; Wedowee—very strongly acid or strongly acid throughout, except where the surface layer has been limed

*Parent material:* Residuum weathered from felsic intrusive rocks

*Depth to bedrock:* Rion and Wedowee—more than 60 inches; Wateree—20 to 40 to soft bedrock and 40 to more than 60 inches to hard bedrock

### **Inclusions**

*Dissimilar inclusions:*

- Random areas of Appling soils that have a clayey subsoil and have saprolite below a depth of 40 inches
- Poorly drained or somewhat poorly drained soils that have a loamy subsoil in the lower landscape positions
- Soils that have hard bedrock within a depth of 20 inches
- Random areas of widely scattered rock outcrops
- Soils that have cobble-sized or larger fragments on the surface
- Random areas of eroded soils that have a surface layer of clay loam or sandy clay loam

*Similar inclusions:*

- Rion, Wateree, and Wedowee soils that have a surface layer of loam

### **Use and Management**

**Major uses:** Woodland

#### **Cropland**

*Suitability:* Suited

*Management concerns:* Rion and Wedowee—limited size of map units, erodibility, and fertility; Wateree—limited size of map units, erodibility, fertility, and rooting depth

*Management measures:*

- Managing these soils for crop production is difficult because of the limited size of the map units and the slope.
- Conservation tillage, crop residue management, stripcropping, and sod-based rotations reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.
- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.
- Incorporating plant residue with the soils helps to improve the water-holding capacity.
- Planting shallow-rooted crops helps to overcome the moderately deep rooting depth in the Wateree soil.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management concerns:* Rion and Wedowee—limited size of map units, erodibility, and fertility; Wateree—limited size of map units, erodibility, fertility, and rooting depth

*Management measures:*

- Managing these soils for the production of pasture and hay crops is difficult because of the limited size of the areas.
- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- Incorporating plant residue with the soils helps to improve the water-holding capacity.
- Planting shallow-rooted crops helps to overcome the moderately deep rooting depth in the Wateree soil.

#### **Woodland**

*Suitability:* Well suited

*Productivity:* Moderately high

*Management concerns:* Wateree—windthrow hazard;

Wedowee—competition from undesirable plants

*Management measures:*

- Periodically harvesting windthrown trees that result from high winds and a limited rooting depth can increase productivity.
- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.

#### **Urban development**

*Suitability:* Suited

*Management concerns:* Rion—slope and corrosivity; Wateree—depth to bedrock, slope, and corrosivity; Wedowee—slope, restricted permeability, low strength, and corrosivity

*Management measures:*

- Installing the distribution lines of septic systems during dry periods helps to prevent smearing and sealing of trench walls in areas of the Wedowee soil.
- Distribution lines should be installed on the contour.
- Areas of included deeper soils may be better suited to septic tank absorption fields than the Wateree soil.
- Structures should be designed so that they conform to the natural slope of the land.
- Providing sand and gravel, compacting roadbeds, and designing roads so that they conform to the natural slope of the land improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.



### ***Interpretive Groups***

*Land capability classification:* Rion and Wedowee—IVe; Wateree—Vle

*Woodland ordination symbol:* Based on loblolly pine as the indicator species, 8A in areas of the Rion and Wedowee soils and 7A in areas of the Wateree soil

## **TaE—Tatum loam, 10 to 25 percent slopes**

### ***Setting***

*Landscape:* Piedmont uplands

*Landform:* Hill slopes adjacent to flood plains and drainageways

*Shape of areas:* Long and narrow or irregularly shaped

*Size of areas:* 10 to 50 acres

### ***Composition***

Tatum soil and similar inclusions: 95 percent

Dissimilar inclusions: 5 percent

### ***Typical Profile***

*Surface layer:*

0 to 5 inches—strong brown loam

*Subsoil:*

5 to 31 inches—red clay

31 to 40 inches—red silty clay loam

*Underlying material:*

40 to 58 inches—yellowish red silty clay loam saprolite

*Bedrock:*

58 to 70 inches—weathered, multicolored schist

### ***Soil Properties and Qualities***

*Depth class:* Deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* High

*Depth to high water table:* More than 6 feet

*Shrink-swell potential:* Moderate

*Surface runoff:* Rapid

*Hazard of water erosion:* Very severe

*Slope class:* Strongly sloping or moderately steep

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Very strongly acid or strongly acid throughout, except where the surface layer has been limed

*Parent material:* Residuum weathered from mixed felsic and mafic volcanic rocks

*Depth to bedrock:* 40 to 60 inches to soft bedrock and more than 60 inches to hard bedrock

### ***Inclusions***

*Dissimilar inclusions:*

- Random areas of Georgeville soils that have bedrock below a depth of 60 inches

- Tatum soils that have cobble-sized or larger fragments on the surface

*Similar inclusions:*

- Tatum soils that have a surface layer of silt loam

### ***Use and Management***

**Major uses:** Woodland

#### **Cropland**

*Suitability:* Poorly suited

*Management concerns:* Erodibility, equipment limitation, and fertility

*Management measures:*

- Conservation tillage, strip cropping, crop residue management, and sod-based rotations reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.
- Managing this soil for cultivated crops is difficult because the slope limits the use of equipment.
- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.

#### **Pasture and hayland**

*Suitability:* Suited

*Management concerns:* Fertility, erodibility, and equipment limitation

*Management measures:*

- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- The use of equipment may be limited by the slope in the steeper areas of the map unit.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

#### **Woodland**

*Suitability:* Suited

*Productivity:* Moderately high

*Management concerns:* Erodibility, equipment limitation, seedling survival, and competition from undesirable plants

*Management measures:*

- Installing broad-based dips, water bars, and culverts helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to reduce the hazard of erosion.
- Constructing roads, fire lanes, and skid trails on the contour helps to overcome the slope.

- Replanting may be necessary on warm, south-facing slopes because of limited soil moisture.
- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.

### **Urban development**

*Suitability:* Poorly suited

*Management concerns:* Slope, low strength, and corrosivity

*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- The slope is a severe limitation affecting urban development.
- Providing sand and gravel, compacting roadbeds, and designing roads so that they conform to the natural slope of the land improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### **Interpretive Groups**

*Land capability classification:* IVe

*Woodland ordination symbol:* 7R, based on loblolly pine as the indicator species

## **Ud—Udorthents, loamy**

### **Setting**

*Landscape:* Mostly uplands and terraces where natural soil has been excavated or covered by earthy fill material

*Landform:* Variable, commonly depressional areas or broad flats in urban areas

*Shape of areas:* Irregularly shaped

*Size of areas:* 2 to 100 acres

### **Composition**

Udorthents and similar inclusions: 90 percent

Dissimilar inclusions: 10 percent

### **Typical Profile**

Udorthents consist of cut and fill areas where soil material has been removed and placed on an adjacent site and, to a lesser extent, quarries, land fills, borrow pits, and recreational areas, such as baseball fields. A typical pedon is not given because of the variable nature of the soil material.

### **Soil Properties and Qualities**

*Depth class:* Deep or very deep

*Drainage class:* Well drained or moderately well drained

*Permeability:* Moderate to slow

*Available water capacity:* Low to high

*Depth to high water table:* Variable; commonly more than 6 feet

*Hazard of flooding:* Variable; commonly none or rare

*Shrink-swell potential:* Low

*Surface runoff:* Medium or rapid

*Hazard of water erosion:* Moderate or severe

*Slope class:* Commonly nearly level or gently sloping; very steep or nearly vertical on some sides of borrow pits

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Extremely acid to moderately acid, except where the surface layer has been limed

*Parent material:* Loamy fill material

*Depth to bedrock:* More than 40 inches

### **Inclusions**

*Dissimilar inclusions:*

- Random areas of Udorthents that are less than 40 inches to bedrock
- Poorly drained or very poorly drained soils in depressions
- Areas of Udorthents adjacent to streams that are subject to frequent or occasional flooding
- Areas of Udorthents that contain asphalt, wood, glass, and other waste materials
- Areas of Udorthents that have stone-sized rock fragments on the surface

*Similar inclusions:*

- Soils that are similar to Udorthents and that have clayey or sandy underlying material

### **Use and Management**

**Major uses:** Urban development or recreational areas

#### **Cropland**

*Suitability:* Poorly suited

*Management concerns:* Areas of highly disturbed soils, limited size of areas, and fertility

*Management measures:*

- Managing areas of this map unit for crop production is difficult because of the highly variable soil properties and the small size of the areas.
- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.

#### **Pasture and hayland**

*Suitability:* Suited

*Management concerns:* Areas of highly disturbed soils, limited size of areas, and fertility

*Management measures:*

- Managing areas of this map unit for the production of pasture and hay crops is difficult because of the highly variable soil properties and the small size of the areas.

- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.
- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.

### **Woodland**

*Suitability:* Poorly suited

*Productivity:* Moderate

*Management concerns:* Areas of highly disturbed soils and limited size of areas

*Management measures:*

- Managing areas of this map unit for timber production is difficult because of the highly variable soil properties and the small size of the areas.

### **Urban development**

*Suitability:* Poorly suited

*Management concerns:* Areas of highly disturbed soils, differential settling, and wetness

*Management measures:*

- Managing areas of this map unit for urban development is difficult because of the highly variable soil properties.
- Soils in this map unit are subject to uneven settling and may be unstable if not properly compacted.

### **Interpretive Groups**

*Land capability classification:* VIIs

*Woodland ordination symbol:* None assigned

## **UrC—Urban land-Iredell-Creedmoor complex, 2 to 10 percent slopes**

### **Setting**

*Landscape:* Piedmont uplands

*Landform:* Ridges and hill slopes

*Shape of areas:* Broad and rounded or irregularly shaped

*Size of areas:* 15 to 300 acres

### **Composition**

Urban land: 60 percent

Iredell soil and similar inclusions: 20 percent

Creedmoor soil and similar inclusions: 15 percent

Dissimilar inclusions: 5 percent

### **Typical Profile**

#### **Iredell**

*Surface layer:*

0 to 5 inches—dark grayish brown loam

*Subsoil:*

5 to 20 inches—dark yellowish brown clay

20 to 26 inches—mixed brownish yellow and dark yellowish brown clay

26 to 40 inches—brownish yellow clay loam that has mottles in shades of dark yellowish brown and dark grayish brown

*Underlying material:*

40 to 55 inches—multicolored loam saprolite in shades of brown, yellow, gray, and black

*Bedrock:*

55 to 65 inches—weathered, multicolored, fractured gabbro

#### **Creedmoor**

*Surface layer:*

0 to 8 inches—brown coarse sandy loam

*Subsoil:*

8 to 12 inches—yellow sandy clay loam

12 to 17 inches—brownish yellow clay

17 to 39 inches—mottled red, pale brown, yellow, and light brownish gray clay

39 to 48 inches—light gray clay that has yellowish red mottles

48 to 60 inches—light gray loam that has strong brown mottles

*Underlying material:*

60 to 68 inches—mottled dark gray and reddish yellow clay loam saprolite

### **Soil Properties and Qualities**

#### **Iredell and Creedmoor**

*Depth class:* Iredell—deep; Creedmoor—very deep

*Drainage class:* Iredell—moderately well drained; Creedmoor—moderately well drained or somewhat poorly drained

*Permeability:* Slow

*Available water capacity:* High

*Depth to high water table:* Iredell—1.0 to 2.0 feet from December through April; Creedmoor—1.5 to 2.0 feet from January through March

*Shrink-swell potential:* Iredell—very high; Creedmoor—high

*Slope class:* Gently sloping or moderately sloping

*Surface runoff:* Medium

*Hazard of water erosion:* Moderate or severe

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Iredell—strongly acid to neutral in the A horizon, moderately acid to slightly alkaline in the B horizon, and neutral or slightly alkaline in the C horizon; Creedmoor—extremely acid to strongly acid throughout, except where the surface layer has been limed

*Parent material:* Iredell—residuum weathered from mafic

intrusive rocks; Creedmoor—residuum weathered from interbedded sedimentary rocks

*Depth to bedrock:* Iredell—40 to 60 inches to soft bedrock and more than 60 inches to hard bedrock; Creedmoor—more than 60 inches

### **Urban land**

- These areas are covered by roads, parking lots, closely spaced buildings, and other urban structures. Identification of the soil series is not feasible.

### **Inclusions**

*Dissimilar inclusions:*

- Soils that are similar to the Iredell soil that have saprolite within a depth of 20 inches
- The well drained Mayodan soils on the slightly higher convex knolls and ridges
- Random areas of Iredell soils that have a surface layer of gravelly loam

*Similar inclusions:*

- Creedmoor soils that have a surface layer of sandy loam or loamy sand

### **Use and Management**

**Major uses:** Urban development

#### **Cropland**

*Suitability:* Poorly suited

*Management concerns:*

- Managing areas of this map unit for crop production is difficult because of the limited size of the areas, intermittent areas of urban land, and areas of highly disturbed soils.

#### **Pasture and hayland**

*Suitability:* Poorly suited

*Management concerns:*

- Managing areas of this map unit for the production of pasture and hay crops is difficult because of the limited size of the areas, intermittent areas of urban land, and areas of highly disturbed soils.

#### **Woodland**

*Suitability:* Poorly suited

*Management concerns:*

- Managing areas of this map unit for timber production is difficult because of the limited size of the areas, intermittent areas of urban land, and areas of highly disturbed soils.

#### **Urban development**

*Suitability:* Poorly suited (fig. 10)

*Management concerns:* Wetness, restricted permeability, shrink-swell potential, low strength, and corrosivity

*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.

- Selecting the highest area of the landscape for building site development and installing an artificial drainage system help to reduce the risk of damage caused by wetness.
- Installing the distribution lines of septic systems during dry periods helps to prevent smearing and sealing of trench walls.
- Reinforcing foundations or backfilling with coarse-textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### **Interpretive Groups**

*Land capability classification:* Urban land—VIIIs; Iredell and Creedmoor—IIIe

*Woodland ordination symbol:* None assigned

## **VaB—Vance sandy loam, 2 to 6 percent slopes**

### **Setting**

*Landscape:* Piedmont uplands

*Landform:* Convex knolls and ridges

*Shape of areas:* Rounded or irregularly shaped

*Size of areas:* 10 to 100 acres

### **Composition**

Vance soil and similar inclusions: 90 percent

Dissimilar inclusions: 10 percent

### **Typical Profile**

*Surface layer:*

0 to 9 inches—yellowish brown sandy loam

*Subsoil:*

9 to 25 inches—brownish yellow clay that has red mottles

25 to 39 inches—brownish yellow clay that has red, yellow, and pale brown mottles

39 to 60 inches—brownish yellow clay loam that has red, yellow, and white mottles

*Underlying material:*

60 to 80 inches—multicolored sandy clay loam saprolite in shades of red, brown, yellow, and white

### **Soil Properties and Qualities**

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Slow

*Available water capacity:* High

*Depth to high water table:* More than 6 feet



**Figure 10.—An area of Urban land-Iredell-Creedmoor complex, 2 to 10 percent slopes. Septic systems can fail in this map unit because of restricted permeability and wetness.**

*Shrink-swell potential:* Moderate  
*Surface runoff:* Medium  
*Hazard of water erosion:* Moderate  
*Slope class:* Gently sloping  
*Organic matter content:* Low  
*Natural fertility:* Low  
*Reaction:* Very strongly acid to moderately acid in the A horizon, except where limed, and very strongly acid or strongly acid in the B and C horizons  
*Parent material:* Residuum weathered from felsic intrusive rocks  
*Depth to bedrock:* More than 60 inches

### ***Inclusions***

#### *Dissimilar inclusions:*

- The moderately well drained Helena soils in depressions
- Random areas of the moderately permeable Appling soils
- Random areas of the moderately permeable Cecil soils on broad ridges that have a subsoil that is redder than that of the Vance soil
- Random areas of eroded Vance soils that have a surface layer of clay loam

*Similar inclusions:*

- Vance soils that have a surface layer of coarse sandy loam

***Use and Management***

**Major uses:** Cropland, pasture and hayland, and woodland

**Cropland**

*Suitability:* Well suited

*Management concerns:* Root penetration, fertility, and erodibility

*Management measures:*

- Planting perennial grasses and legumes in rotation helps to break up the clayey root zone.
- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.
- Terraces and diversions, stripcropping, contour farming, no-till farming, and crop residue management reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.

**Pasture and hayland**

*Suitability:* Well suited

*Management concerns:* Fertility and erodibility

*Management measures:*

- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

**Woodland**

*Suitability:* Well suited

*Productivity:* Moderately high

*Management concerns:* Competition from undesirable plants and equipment limitation

*Management measures:*

- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.
- Unsurfaced roads may be impassible during wet periods because of the content of clay in the surface layer.
- Planting the appropriate species, as recommended by a forester, helps to maximize productivity and ensure planting success.

**Urban development**

*Suitability:* Suited

*Management concerns:* Restricted permeability, shrink-swell potential, low strength, and corrosivity

*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Installing the distribution lines of septic systems during dry periods helps to prevent smearing and sealing of trench walls.
- Reinforcing foundations or backfilling with coarse-textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

***Interpretive Groups***

*Land capability classification:* IIIe

*Woodland ordination symbol:* 7A, based on loblolly pine as the indicator species

**VaC—Vance sandy loam, 6 to 10 percent slopes*****Setting***

*Landscape:* Piedmont uplands

*Landform:* Narrow hill slopes

*Shape of areas:* Rounded to long or irregularly shaped

*Size of areas:* 10 to 30 acres

***Composition***

Vance soil and similar inclusions: 70 percent

Dissimilar inclusions: 30 percent

***Typical Profile***

*Surface layer:*

0 to 4 inches—dark brown sandy loam

*Subsoil:*

4 to 24 inches—yellowish red clay

24 to 30 inches—yellowish red clay that has red and brownish yellow mottles

30 to 48 inches—brownish yellow clay loam that has yellowish red and reddish brown mottles

*Underlying material:*

48 to 62 inches—multicolored sandy clay loam saprolite in shades of red, yellow, and white

***Soil Properties and Qualities***

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Slow

*Available water capacity:* High

*Depth to high water table:* More than 6 feet



*Shrink-swell potential:* Moderate

*Surface runoff:* Medium

*Hazard of water erosion:* Severe

*Slope class:* Moderately sloping

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Very strongly acid to moderately acid throughout, except where the surface layer has been limed

*Parent material:* Residuum weathered from felsic intrusive rocks

*Depth to bedrock:* More than 60 inches

### ***Inclusions***

*Dissimilar inclusions:*

- The moderately well drained Helena soils on the lower hill slopes
- Random areas of the moderately permeable Appling soils
- Random areas of the moderately permeable Cecil soils on broad ridges that have a subsoil that is redder than that of the Vance soil
- Random areas of eroded Vance soils that have a surface layer of clay loam

*Similar inclusions:*

- Vance soils that have a surface layer of coarse sandy loam

### ***Use and Management***

**Major uses:** Cropland, pasture and hayland, and woodland

#### **Cropland**

*Suitability:* Suited

*Management concerns:* Root penetration, fertility, and erodibility

*Management measures:*

- Planting perennial grasses and legumes in rotation helps to break up the clayey root zone.
- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.
- Conservation tillage, stripcropping, crop residue management, and sod-based rotations reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management concerns:* Fertility and erodibility

*Management measures:*

- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- Preparing seedbeds on the contour or across the

slope helps to reduce the hazard of erosion and increases germination.

- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

#### **Woodland**

*Suitability:* Well suited

*Productivity:* Moderately high

*Management concerns:* Competition from undesirable plants and equipment limitation

*Management measures:*

- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.
- Unsurfaced roads may be impassible during wet periods because of the content of clay in the surface layer.
- Planting the appropriate species, as recommended by a forester, helps to maximize productivity and ensure planting success.

#### **Urban development**

*Suitability:* Suited

*Management concerns:* Restricted permeability, shrink-swell potential, slope, low strength, and corrosivity

*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Installing the distribution lines of septic systems during dry periods helps to prevent smearing and sealing of trench walls.
- Reinforcing foundations or backfilling with coarse-textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Structures should be designed so that they conform to the natural slope of the land or constructed in the less sloping areas.
- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### ***Interpretive Groups***

*Land capability classification:* IVe

*Woodland ordination symbol:* 7A, based on loblolly pine as the indicator species

## **WaE—Wateree-Rion-Wedowee complex, 15 to 30 percent slopes**

### ***Setting***

*Landscape:* Piedmont uplands

*Landform:* Wateree—the lower hill slopes; Rion—the

upper and middle parts of hill slopes; Wedowee—hill slopes

*Shape of areas:* Long and narrow or irregularly shaped

*Size of areas:* 15 to 30 acres

### **Composition**

Wateree soil and similar inclusions: 35 percent

Rion soil and similar inclusions: 30 percent

Wedowee soil and similar inclusions: 20 percent

Dissimilar inclusions: 15 percent

### **Typical Profile**

#### **Wateree**

*Surface layer:*

0 to 4 inches—brown sandy loam

*Subsoil:*

4 to 21 inches—yellowish brown sandy loam

*Underlying material:*

21 to 37 inches—very pale brown coarse sandy loam saprolite

*Bedrock:*

37 to 62 inches—weathered, multicolored granite

#### **Rion**

*Surface layer:*

0 to 8 inches—brown sandy loam

8 to 14 inches—yellowish brown sandy loam

*Subsurface layer:*

14 to 20 inches—brownish yellow sandy loam

*Subsoil:*

20 to 38 inches—brownish yellow sandy clay loam

38 to 55 inches—reddish yellow sandy loam

*Underlying material:*

55 to 72 inches—strong brown coarse sandy loam saprolite

*Bedrock:*

72 to 74 inches—weathered, multicolored schist

#### **Wedowee**

*Surface layer:*

0 to 8 inches—dark brown sandy loam

*Subsurface layer:*

8 to 12 inches—brownish yellow sandy loam

*Subsoil:*

12 to 20 inches—strong brown clay loam

20 to 35 inches—strong brown sandy clay

*Underlying material:*

35 to 62 inches—multicolored sandy loam saprolite in shades of red, brown, and yellow

### **Soil Properties and Qualities**

*Depth class:* Wateree—moderately deep; Rion and Wedowee—very deep

*Drainage class:* Well drained

*Permeability:* Wateree—moderately rapid; Rion and Wedowee—moderate

*Available water capacity:* Moderate

*Depth to high water table:* More than 6 feet

*Shrink-swell potential:* Low

*Surface runoff:* Rapid

*Hazard of water erosion:* Very severe

*Slope class:* Moderately steep or steep

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Wateree—very strongly acid to moderately acid in the A and B horizons, except where the surface layer has been limed, and extremely acid to moderately acid in the C horizon; Rion—very strongly acid to slightly acid throughout, except where the surface layer has been limed; Wedowee—extremely acid to strongly acid throughout, except where the surface layer has been limed

*Parent material:* Residuum weathered from felsic intrusive rocks

*Depth to bedrock:* Wateree—20 to 40 to soft bedrock and 40 to more than 60 inches to hard bedrock; Rion and Wedowee—more than 60 inches

### **Inclusions**

*Dissimilar inclusions:*

- Random areas of Pacolet soils that have a red clayey subsoil
- Poorly drained and somewhat poorly drained soils that have a loamy subsoil in the lower landscape positions
- Soils that have a loamy subsoil and have hard bedrock within a depth of 20 inches
- Soils that have cobble-sized or larger fragments on the surface
- Soils that have widely scattered areas of rock outcrops
- Random areas of eroded soils that have a surface layer of clay loam or sandy clay loam

*Similar inclusions:*

- Wateree, Rion, and Wedowee soils that have a surface layer of loam

### **Use and Management**

**Major uses:** Woodland

#### **Cropland**

*Suitability:* Poorly suited

*Management concerns:* Wedowee and Rion—limited size of areas, erodibility, fertility, and slope; Wateree—limited size of areas, erodibility, fertility, slope, and rooting depth

*Management measures:*

- Managing these soils for crop production is difficult

because of the limited size of the areas and the slope.

- Conservation tillage, crop residue management, stripcropping, and sod-based rotations reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.
- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.
- Incorporating plant residue with the soils helps to improve the water-holding capacity.
- Planting shallow-rooted crops helps to overcome the moderately deep rooting depth in the Wateree soil.

### **Pasture and hayland**

*Suitability:* Suited

*Management concerns:* Rion and Wedowee—limited size of areas, erodibility, and fertility; Wateree—limited size of areas, erodibility, fertility, and rooting depth

*Management measures:*

- Managing these soils for the production of pasture and hay crops is difficult because of the limited size of the areas and the slope.
- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- Incorporating plant residue with the soils helps to improve the water-holding capacity.
- Planting shallow-rooted crops helps to overcome the moderately deep rooting depth in the Wateree soil.

### **Woodland**

*Suitability:* Suited

*Productivity:* Moderately high

*Management concerns:* Rion—erodibility and equipment limitation; Wateree—erodibility, equipment limitation, seedling survival, and windthrow hazard; Wedowee—erodibility, equipment limitation, and competition from undesirable plants

*Management measures:*

- Establishing permanent plant cover on roads and landings following logging operations helps to reduce the hazard of erosion and prevent the siltation of streams.
- Constructing roads, fire lanes, and skid trails on the contour helps to overcome the slope.
- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.
- Periodically harvesting windthrown trees that result from high winds and a limited rooting depth can

increase productivity in areas of the Wateree soil.

- Replanting may be necessary on warm, south-facing slopes because of limited soil moisture.

### **Urban development**

*Suitability:* Poorly suited

*Management concerns:* Wateree—depth to bedrock, slope, and corrosivity; Rion—slope and corrosivity; Wedowee—slope, restricted permeability, low strength, and corrosivity

*Management measures:*

- Areas of included deeper soils may be better suited to septic tank absorption fields than the Wateree soil.
- Installing the distribution lines of septic systems during dry periods helps to prevent smearing and sealing of trench walls in areas of the Wedowee soil.
- Distribution lines should be installed on the contour.
- Structures should be designed so that they conform to the natural slope of the land.
- Providing sand and gravel, compacting roadbeds, and designing roads so that they conform to the natural slope of the land improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### **Interpretive Groups**

*Land capability classification:* Wateree—VIIe; Rion and Wedowee—VIe

*Woodland ordination symbol:* Based on loblolly pine as the indicator species, 7R in areas of the Wateree soil and 8R in areas of the Rion and Wedowee soils

## **WeB—Wedowee coarse sandy loam, 2 to 6 percent slopes**

### **Setting**

*Landscape:* Piedmont uplands

*Landform:* Broad ridges

*Shape of areas:* Long or irregularly shaped

*Size of areas:* 10 to 80 acres

### **Composition**

Wedowee soil and similar inclusions: 70 percent

Dissimilar inclusions: 30 percent

### **Typical Profile**

*Surface layer:*

0 to 4 inches—dark grayish brown sandy loam

*Subsurface layer:*

4 to 7 inches—brownish yellow coarse sandy loam

*Subsoil:*

7 to 23 inches—strong brown clay that has brownish yellow and red mottles

23 to 35 inches—strong brown clay loam that has red and brownish yellow mottles

*Underlying material:*

35 to 65 inches—multicolored sandy clay loam saprolite in shades of brown, yellow, and white

### **Soil Properties and Qualities**

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* Moderate

*Depth to high water table:* More than 6 feet

*Shrink-swell potential:* Low

*Surface runoff:* Medium

*Hazard of water erosion:* Moderate

*Slope class:* Gently sloping

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Extremely acid to strongly acid throughout, except where the surface layer has been limed

*Parent material:* Residuum weathered from felsic intrusive rocks

*Depth to bedrock:* More than 60 inches

### **Inclusions**

*Dissimilar inclusions:*

- The slowly permeable Vance soils on narrow ridges and knolls
- The poorly drained Wehadkee soils and somewhat poorly drained Chewacla soils that have a loamy subsoil on flood plains
- The well drained Appling soils on broad ridges that have saprolite below a depth of 40 inches
- Random areas of the well drained Pacolet soils on hill slopes that have a subsoil that is redder than that of the Wedowee soil
- Random areas of soils that have stones or boulders on the surface
- Random areas of eroded Wedowee soils that have a surface layer of clay loam or sandy clay loam

*Similar inclusions:*

- Wedowee soils that have a surface layer of loam, fine sandy loam, or coarse sandy loam

### **Use and Management**

**Major uses:** Cropland, pasture and hayland, and woodland

#### **Cropland**

*Suitability:* Well suited

*Management concerns:* Fertility and erodibility

*Management measures:*

- Applying lime and fertilizer according to recommendations based on soil tests increases the

availability of plant nutrients and helps to maximize productivity.

- Terraces and diversions, stripcropping, contour farming, no-till farming, and crop residue management reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management concerns:* Fertility and erodibility

*Management measures:*

- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

#### **Woodland**

*Suitability:* Well suited

*Productivity:* Moderately high

*Management concerns:* Competition from undesirable plants

*Management measures:*

- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.
- Planting the appropriate species, as recommended by a forester, helps to maximize productivity and ensure planting success.

#### **Urban development**

*Suitability:* Suited

*Management concerns:* Restricted permeability, low strength, and corrosivity

*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Installing the distribution lines of septic systems during dry periods helps to prevent smearing and sealing of trench walls.
- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### **Interpretive Groups**

*Land capability classification:* IIe

*Woodland ordination symbol:* 8A, based on loblolly pine as the indicator species

## **WeC—Wedowee sandy loam, 6 to 10 percent slopes**

### ***Setting***

*Landscape:* Piedmont uplands

*Landform:* Narrow hill slopes

*Shape of areas:* Long or irregularly shaped

*Size of areas:* 10 to 30 acres

### ***Composition***

Wedowee soil and similar inclusions: 75 percent

Dissimilar inclusions: 25 percent

### ***Typical Profile***

*Surface layer:*

0 to 8 inches—dark brown sandy loam

*Subsurface layer:*

8 to 12 inches—brownish yellow sandy loam

*Subsoil:*

12 to 20 inches—strong brown clay loam

20 to 35 inches—strong brown sandy clay loam

*Underlying material:*

35 to 65 inches—multicolored sandy loam saprolite in shades of red, brown, and yellow

### ***Soil Properties and Qualities***

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* Medium

*Depth to high water table:* More than 6 feet

*Shrink-swell potential:* Low

*Surface runoff:* Medium

*Hazard of water erosion:* Severe

*Slope class:* Strongly sloping

*Organic matter content:* Low

*Natural fertility:* Low

*Reaction:* Extremely acid to strongly acid throughout, except where the surface layer has been limed

*Parent material:* Residuum weathered from felsic intrusive rocks

*Depth to bedrock:* More than 60 inches

### ***Inclusions***

*Dissimilar inclusions:*

- The slowly permeable Enon and Vance soils on the slightly higher knolls
- Random areas of soils that have a loamy subsoil and have soft bedrock at a depth of 20 to 40 inches
- Random areas of soils that have stones or boulders on the surface
- Random areas of eroded Wedowee soils that have a surface layer of clay loam or sandy clay loam

*Similar inclusions:*

- Wedowee soils that have a surface layer of loam, fine sandy loam, or coarse sandy loam

### ***Use and Management***

**Major uses:** Cropland, pasture and hayland, and woodland

#### **Cropland**

*Suitability:* Suited

*Management concerns:* Fertility and erodibility

*Management measures:*

- Applying lime and fertilizer according to recommendations based on soil tests increases the availability of plant nutrients and helps to maximize productivity.
- Conservation tillage, stripcropping, crop residue management, and sod-based rotations reduce the hazard of erosion, control runoff, and increase the infiltration of rainfall.

#### **Pasture and hayland**

*Suitability:* Well suited

*Management concerns:* Fertility and erodibility

*Management measures:*

- The pasture can be renovated as needed by applying the proper amounts of lime and fertilizer and by planting suitable seed mixtures.
- Preparing seedbeds on the contour or across the slope helps to reduce the hazard of erosion and increases germination.
- A rotational grazing system and a well-planned clipping and harvesting schedule help to keep the pasture in good condition and increase productivity.

#### **Woodland**

*Suitability:* Well suited

*Productivity:* Moderately high

*Management concerns:* Competition from undesirable plants

*Management measures:*

- Site preparation practices, such as chopping, prescribed burning, and applications of herbicides, help to reduce competition from unwanted plants.
- Planting the appropriate species, as recommended by a forester, helps to maximize productivity and ensure planting success.

#### **Urban development**

*Suitability:* Suited

*Management concerns:* Restricted permeability, slope, low strength, and corrosivity

*Management measures:*

- The local Health Department should be contacted for guidance in developing sanitary facilities.
- Installing the distribution lines of septic systems during

dry periods helps to prevent smearing and sealing of trench walls.

- Structures should be designed so that they conform to the natural slope of the land or constructed in the less sloping areas.
- Providing sand and gravel and compacting roadbeds improve soil strength on sites for local roads and streets.

- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

### ***Interpretive Groups***

*Land capability classification:* IIIe

*Woodland ordination symbol:* 8A, based on loblolly pine as the indicator species



# Prime Farmland

In this section, prime farmland is defined and the soils in Granville County that are considered prime farmland are listed.

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, State, and Federal levels, as well as individuals, must encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to food, feed, forage, fiber, and oilseed crops. Such soils have properties that favor the economic production of sustained high yields of crops. The soils need only to be treated and managed by acceptable farming methods. The moisture supply must be adequate, and the growing season must be sufficiently long. Prime farmland soils produce the highest yields with minimal expenditure of energy and economic resources. Farming these soils results in the least damage to the environment.

Prime farmland soils may presently be used as cropland, pasture, or woodland or for other purposes. They are used for food or fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water-control structures. Public land is land not available for farming in National forests, National parks, military reservations, and State parks.

Prime farmland soils usually receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are

permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not frequently flooded during the growing season. The slope ranges mainly from 0 to 8 percent.

The following map units are considered prime farmland in Granville County. The location of each map unit is shown on the detailed soil maps at the back of this publication. The extent of each unit is given in table 4. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

Soils that are frequently flooded during the growing season qualify as prime farmland only in areas where this limitation has been overcome by flood control. The need for these measures is indicated in parentheses after the map unit name in the following list. Onsite evaluation is necessary to determine whether or not limitations have been overcome by the corrective measures.

The soils identified as prime farmland in Granville County are:

AaA	Altavista loam, 0 to 3 percent slopes, rarely flooded
ApB	Appling sandy loam, 2 to 6 percent slopes
CaB	Cecil sandy loam, 2 to 6 percent slopes
CeB2	Cecil clay loam, 2 to 6 percent slopes, eroded
CoA	Congaree silt loam, 0 to 2 percent slopes, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
CrB	Creedmoor coarse sandy loam, 2 to 6 percent slopes
EnB	Enon loam, 2 to 6 percent slopes
GeB	Georgeville silt loam, 2 to 6 percent slopes
HeB	Helena sandy loam, 2 to 6 percent slopes
HrB	Herndon silt loam, 2 to 6 percent slopes
MaB	Mayodan sandy loam, 2 to 6 percent slopes
NaB	Nason gravelly loam, 2 to 6 percent slopes
VaB	Vance sandy loam, 2 to 6 percent slopes
WeB	Wedowee sandy loam, 2 to 6 percent slopes



# Use and Management of the Soils

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This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Generally, the soils in Granville County that are well suited to crops are also well suited to urban uses. The data concerning specific soils in the county can be used in planning future land use patterns. The potential for farming should be considered relative to any soil limitations and the potential for nonfarm development.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern that is in harmony with nature.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

## Crops and Pasture

Otho C. Lyons, soil conservation technician, and Bobby Brock, agronomist, Natural Resources Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils are identified; the system of land capability classification used by the Natural Resources Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units" and in the tables. Specific information can be obtained from the local office of the Natural Resources Conservation Service or the North Carolina Cooperative Extension Service.

In 1992, Granville County had about 60,925 acres of cropland. Of this acreage, 25,443 acres was harvested cropland, 17,728 acres was cropland used for pasture or grazing, and 17,754 acres was classified as other cropland. The main crops were tobacco, soybeans, corn, milo, and small grains (21).

Tobacco is the main cash crop in Granville County. According to the North Carolina Agricultural Statistics, about 7,650 acres of tobacco was harvested in 1992 at an average of 2,095 pounds per acre (10). This crop is grown mostly on Georgeville and Herndon soils in the northern part of the county, on Cecil, Georgeville, Herndon, and Vance soils in the central part of the county, and on Cecil and Creedmoor soils in the southern part of the county (fig. 11).

Corn, soybeans, and small grains are grown on most of the soils in Granville County. In 1992, the county had about 3,700 acres of corn, 7,200 acres of soybeans, 8,600 acres of wheat, and 1,800 acres of oats. In areas where wheat is grown for grain, soybeans are often produced in early summer (10).

## Specialty Crops

Specialty crops grown commercially in Granville County are vegetables, small fruits, and nursery plants.



**Figure 11.—Tobacco commonly requires irrigation during the drier summer months in areas of Cecil sandy loam, 2 to 6 percent slopes.**

A small acreage is used for melons, strawberries, sweet corn, tomatoes, peppers, sweet potatoes, and other vegetables and small fruits. In addition, large areas in the county can be adapted to other specialty crops, such as blueberries, grapes, and many vegetables.

Deep soils that have good natural drainage and that warm up early in spring are especially well suited to many vegetables and small fruits. Crops can generally be planted and harvested earlier on these soils than on the other soils in the county.

Information on growing specialty crops can be obtained from the local office of the Cooperative

Extension Service or the Natural Resources Conservation Service.

#### **Pasture and Hayland**

Pasture and hayland make up a large percentage of the open land in Granville County. Almost all of the soils in the county are suited to both cool-season grasses, such as fescue, clovers, and orchardgrass, and to warm-season grasses, such as bermudagrass, switchgrass, and alfalfa.

Proper management is important in maintaining the quality and quantity of forage. Under proper

management, all of the soils in Granville County can produce adequate forage. Management practices include adjusting stocking rates, rotating livestock, mowing and clipping, controlling weeds, applying lime and fertilizer, and installing a drainage system in the wetter areas. Uniform grazing can be promoted by providing additional fences and by properly locating watering facilities, salt licks, and supplemental feeding areas.

### **Chemical Weed Control**

The use of herbicides for weed control is a common practice on the cropland in Granville County. It decreases the need for tillage and is an integral part of modern farming. Selected soil properties, such as organic matter content and texture of the surface layer, affect the rate of herbicide application. Estimates of both of these properties were determined for the soils in the county. Table 14 shows a general range of organic matter content in the surface layer of the soils. The texture of the surface layer is shown in the USDA texture column in table 13.

In some areas the organic matter content projected for the different soils is outside the range shown in the table. The content can be higher in soils that have received large amounts of animal or manmade waste. Soils that have recently been brought into cultivation may have a higher content of organic matter in the surface layer than similar soils that have been cultivated for a long time. Conservation tillage can increase the content of organic matter in the surface layer. A lower content of organic matter is common where the surface layer has been partly or completely removed by erosion, land smoothing, or other activities. Current soil tests should be used to measure the organic matter content before the required herbicide rates are determined. The herbicide labels show specific application rates based on the organic matter content and texture of the surface layer.

### **Soil Fertility**

The soils in Granville County generally are low in natural fertility and are naturally acid. Additions of lime and fertilizer are needed for the production of most kinds of crops.

Liming requirements are a major concern on cropland. The acidity level in the soil affects the availability of many nutrients to plants and the activity of beneficial bacteria. Lime neutralizes exchangeable aluminum in the soil and thus counteracts the adverse effects of high levels of aluminum on many crops. Liming adds calcium (from calcitic lime) or calcium and magnesium (from dolomitic lime) to the soil.

A soil test is a guide to what amount and kind of lime should be used. The desired pH levels may differ, depending on the soil properties and the crop to be grown.

Nitrogen fertilizer is required for most crops. It is generally not required, however, for peanuts and clover, in some rotations of soybeans, and for alfalfa that is established. A reliable soil test is not available for predicting nitrogen requirements. Appropriate rates of nitrogen application are described in the section "Yields per Acre."

Soil tests can indicate the need for phosphorus and potassium fertilizer. They are needed because phosphorus and potassium tend to build up in the soil. The Cooperative Extension Service can help to determine the kinds and amounts of fertilizer and lime needed.

Applications of livestock waste can complement a good soil fertility program. Federal and State regulations should be followed when applying animal waste. Nutrient requirements of the crop should not be exceeded when applying the waste to cropland. Excessive amounts of nutrients can result in surface runoff and the pollution of ground water. Livestock producers should have the waste analyzed before it is applied to crops.

### **Soil Erosion**

Soil erosion is the main concern on about 85 percent of the cropland in Granville County. In areas where the slope is 2 percent or more, erosion is a hazard. Loss of the surface layer through erosion is damaging. Soil productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils that have a clayey subsoil, such as Appling, Cecil, Creedmoor, Enon, Georgeville, Helena, Herndon, Mayodan, and Vance soils, and on soils that have a layer in or below the subsoil that limits the depth of the root zone, such as Wateree soils. Erosion on farmland results in the sedimentation of streams. Controlling erosion minimizes the pollution of streams by sediment and improves the quality of the water for municipal use, for recreation, and for fish and wildlife.

Tilling or preparing a good seedbed is difficult in eroded, clayey spots in sloping areas. These spots are common in areas of the moderately eroded Cecil, Creedmoor, Georgeville, and Vance soils. Erosion-control practices provide a protective surface cover, reduce runoff, and increase the infiltration of water. A cropping system that keeps a vegetative cover on the soil for extended periods helps to minimize soil loss and maintain the productive capacity of the soil.

In some parts of the county, short, irregular slopes hinder contour farming and the use of parallel terraces. In these areas conservation practices, such as strip cropping, conservation tillage, proper use of crop residue, and sod-based rotations, can greatly reduce the hazard of erosion. These practices can be adapted to most of the soils in the county but are less successful on eroded soils. No-till farming of corn and soybeans helps to control erosion in sloping areas and can be adapted to most of the soils in the county.

Conservation tillage can be used in any resource management system to effectively control erosion. Crop residue left on the surface protects the soil from erosive rainfall by allowing the water to gently soak into the soil. This protective cover also reduces the amount of moisture lost through evaporation and thus conserves moisture for crop production. If conservation tillage is used continuously, plant-derived organic matter accumulates and degrades at the soil surface and thus promotes the development of stable soil aggregates, which enhance water infiltration. Conservation tillage that includes weed control by herbicides also increases the amount of water available to crops by eliminating competing plants. Most soils in Granville County are suited to conservation tillage.

Conservation practices, such as parallel diversions, contour farming, and strip cropping, can be used on a variety of soils but are best suited to soils that have smooth, uniform slopes.

Generally, a single conservation practice cannot solve an erosion problem. A conservation system usually requires a combination of two or more conservation practices that are each applied to specific soils. A complete conservation system can reduce the amount of erosion to an acceptable level.

Assistance with the design and construction of conservation systems is available from the Natural Resources Conservation Service.

### Soil Drainage

Excessive wetness is a problem on several of the cultivated soils in Granville County. Altavista, Congaree, Creedmoor, Helena, Iredell, Lignum, and Picture soils may require an artificial drainage system to improve productivity and reduce the limitations associated with wetness. The clayey Creedmoor, Helena, Iredell, Lignum, and Picture soils may require more intensive treatment measures and may respond more slowly than the loamy Altavista and Congaree soils. The local office of the Natural Resources Conservation Service provides assistance in designing and installing surface and subsurface drainage systems.

Managing areas of Congaree, Chewacla, and

Wehadkee soils for cropland is difficult because of the potential for flooding during the growing season.

*Federal and State regulations require that any area designated as wetlands cannot be altered without prior approval. The local office of the Natural Resources Conservation Service should be contacted for the identification of hydric soils and potential wetlands.*

### Soil Tillth

Soil tillth is an important factor in the germination of seeds and in the infiltration of water into the soil. Soils that have good tillth are granular and porous.

In Granville County, most of the soils used for crops have a surface layer that is silt loam and sandy loam, is light colored, and has a low content of organic matter. Generally, the structure of these soils is weak. Intense rainfall results in the formation of a crust on the surface. The crust is hard when dry and nearly impervious to water. It reduces infiltration and increases runoff. Regular additions of crop residue, manure, and other organic material can improve soil structure and prevent the formation of a crust.

Generally, fall plowing is not recommended. Most of the cropland consists of sloping soils that are subject to damaging erosion if they are plowed in fall.

Wheat is the common close-growing crop in the county. Rye, barley, buckwheat, and oats also can be grown.

### Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.



A high level of management includes maintaining proper soil reaction and fertility levels as indicated by standard soil tests. The application rates of nitrogen for corn on soils that have a yield potential of 125 to 150 bushels per acre should be 140 to 160 pounds per acre. If the yield potential for corn is 100 bushels per acre or less, a rate of 100 to 120 pounds of nitrogen per acre should be used. The application of nitrogen in excess of that required for potential yields generally is not recommended. The excess nitrogen fertilizer that is not utilized by a crop is an unnecessary expense and causes a hazard of water pollution. If corn or cotton is grown after the harvest of soybeans or peanuts, nitrogen rates can be reduced by about 20 to 30 pounds per acre. Because nitrogen can be readily leached from sandy soils, applications may be needed on these soils more than once during the growing season.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the North Carolina Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

### Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland (17). Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit. Only class and subclass are used in this survey.

*Capability classes*, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode, but they have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

*Capability subclasses* are soil groups within one class. They are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless a close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

There are no subclasses in class I because the soils of this class have few limitations. The soils in class V are subject to little or no erosion, but they have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation. Class V contains only the subclasses indicated by *w*, *s*, or *c*.

The capability classification of each map unit component is given in the section "Detailed Soil Map Units" and in table 5.

### Fertility Capability Classification

Stanley W. Buol, professor of soil science, North Carolina State University, helped prepare this section.

In this section, the system of fertility capability classification (FCC) is discussed and the FCC soil groups are listed. Granville County has four major FCC soil groups. The map units which make up these groups are primarily used as cropland. FCC soil groups have also been assigned to map units that are used as pasture and hayland or woodland. The capability classification of each soil is listed in table 5.

The objective of the FCC system is to group soils that have similar responses to agronomic soil management practices (12, 14). The FCC system was designed to be used by agronomists, but farmers, ranchers, and foresters can also use the system in making management decisions.

The following paragraphs describe the FCC categories and condition modifiers used to describe the map units in Granville County.

The two categories identified in the FCC system are *surface type* and *subsurface type*. The types are designated by the capital letters *S*, *L*, and *C*. *S* indicates a sandy texture, including sands and loamy sands; *L* indicates a loamy texture that is less than 35 percent clay but is not sandy; and *C* indicates a clayey texture that is more than 35 percent clay.

All soils receive a surface type designation. This designation is based on the texture of the uppermost 8 inches of the plow layer after mixing. The subsurface type designation is based on the texture of the material below the plow layer, generally between depths of 8 and 20 inches, and usually indicates a significant change in texture within a depth of 20 inches. This designation is used only if it differs from that of the surface type.

Condition modifiers are designated by lowercase letters. The letter *g* is a water table modifier and indicates a gleyed condition. Gleyed soils, as defined by the FCC system, are saturated within a depth of 25 inches for more than 60 days each year or have mottles with chroma of 2 within a depth of 25 inches.

The letters *a* and *h* are soil reaction modifiers. The letter *a* indicates soils that have aluminum toxicity. These soils have a content of exchangeable aluminum that is more than 60 percent of the effective cation-exchange capacity within a depth of 20 inches. The aluminum toxicity of a soil may need to be determined in specific fields because long-term use of lime can decrease aluminum saturation to a depth of 20 inches. The letter *h* indicates acid soils. These soils have a content of exchangeable aluminum that is 10 to 60 percent of the effective cation-exchange capacity within a depth of 20 inches. The exchangeable aluminum percentage of the effective cation-exchange capacity is the preferred criteria for the soil reaction modifiers, but 1:1 water pH values in the upper 20 inches of soil material can be used. If the latter method is used, *a* indicates a pH of less than 5.0 and *h* indicates a pH of 5.0 to 6.0 within a depth of 20 inches.

A prime mark (') is the gravel content modifier. It indicates soils that have 15 to 35 percent, by volume, gravel or rock fragments larger than 2 millimeters in diameter.

The fertility capability classification groups for the

major cropland soils in Granville County are described in the following paragraphs.

Group 1 soils, indicated as *LC a*, have a loamy surface layer and a clayey substratum. In areas of these soils, rainfall can cause surface crusting before plants emerge. No-till farming or reduced tillage practices that leave plant residue on the surface help to prevent surface crusting. Toxic levels of aluminum limit the rooting depth of aluminum-sensitive crops, such as alfalfa. Aluminum-tolerant species should be planted. A lime maintenance program that is based on soil test recommendations is needed. The soils have slopes ranging from 2 to 6 percent and from 6 to 10 percent. Conservation practices should be applied according to guidelines of the Natural Resources Conservation Service.

The cropland soils identified as *LC a* are as follows:

ApB	Appling sandy loam, 2 to 6 percent slopes
ApC	Appling sandy loam, 6 to 10 percent slopes
CaB	Cecil sandy loam, 2 to 6 percent slopes
CeB2	Cecil clay loam, 2 to 6 percent slopes, eroded
CeC2	Cecil clay loam, 6 to 10 percent slopes, eroded
WeB	Wedowee sandy loam, 2 to 6 percent slopes
WeC	Wedowee sandy loam, 6 to 10 percent slopes

Group 2 soils, indicated as *LC h*, have a loamy surface layer and a clayey substratum. In areas of these soils, rainfall can cause surface crusting before plants emerge. No-till farming or reduced tillage practices that leave plant residue on the surface help to prevent surface crusting. Lime should be applied according to the results of field tests. Group 2 soils generally are better suited to aluminum-sensitive crops, such as alfalfa, than group 1 soils. They have slopes ranging from 2 to 6 percent and from 6 to 10 percent. Conservation practices should be applied according to guidelines of the Natural Resources Conservation Service.

The cropland soils identified as *LC h* are as follows:

CrB	Creedmoor coarse sandy loam, 2 to 6 percent slopes
CrC	Creedmoor coarse sandy loam, 6 to 10 percent slopes
EnB	Enon loam, 2 to 6 percent slopes
EnC	Enon loam, 6 to 10 percent slopes
GeB	Georgeville silt loam, 2 to 6 percent slopes
GeC	Georgeville silt loam, 6 to 10 percent slopes
IrB	Iredell loam, 2 to 6 percent slopes
IrC	Iredell loam, 6 to 10 percent slopes
VaB	Vance sandy loam, 2 to 6 percent slopes
VaC	Vance sandy loam, 6 to 10 percent slopes

Group 3 soils, indicated as *L h*, have a loamy surface layer and substratum. Plowing to greater depths and installing terraces do not expose a clayey substratum in group 3 soils as in soils of groups 1 and 2. Group 3 soils generally have the best surface texture, but rainfall can result in some surface crusting before plants emerge. No-till farming or reduced tillage practices that leave plant residue on the surface help to prevent surface crusting. Lime should be applied according to the results of soil tests. Generally, the rooting depth of aluminum-sensitive crops, such as alfalfa, is greater in these soils than in group 1 soils. Group 3 soils have slopes ranging from 2 to 6 percent and from 6 to 10 percent. Conservation practices should be applied according to guidelines of the Natural Resources Conservation Service.

The cropland soils identified as *L h* are as follows:

AaA	Altavista loam, 0 to 3 percent slopes, rarely flooded
ChA	Chewacla and Wehadkee soils, 0 to 2 percent slopes, frequently flooded
CoA	Congaree silt loam, 0 to 2 percent slopes, frequently flooded
HeB	Helena sandy loam, 2 to 6 percent slopes
HeC	Helena sandy loam, 6 to 10 percent slopes
HrB	Herndon silt loam, 2 to 6 percent slopes
HrC	Herndon silt loam, 6 to 10 percent slopes
LmB	Lignum silt loam, 2 to 6 percent slopes
MaB	Mayodan sandy loam, 2 to 6 percent slopes

Group 4 soils, indicated as *L' h*, have management requirements similar to those of group 1 soils. However, they contain large amounts of gravel within the surface layer that hinder the use of some machinery. These soils have slopes ranging from 2 to 6 percent and from 6 to 10 percent. Conservation practices should be applied according to guidelines of the Natural Resources Conservation Service.

The cropland soils identified as *L' h* are as follows:

NaB	Nason gravelly loam, 2 to 6 percent slopes
NaC	Nason gravelly loam, 6 to 10 percent slopes

## Woodland Management and Productivity

Albert Coffey, forester, Natural Resources Conservation Service, and Tom Harris, forester, North Carolina Forest Service, helped prepare this section.

Owners of woodland in Granville County have many objectives. These objectives include producing timber; conserving wildlife, soil, and water; preserving esthetic values; and providing opportunities for recreational activities, such as commercial hunting. Public demand

for clean water and recreational areas creates pressures and opportunities for owners of woodland.

The landowner interested in timber production is faced with the challenge of producing greater yields from smaller areas. Meeting this challenge requires intense management and silvicultural practices. Many modern silvicultural techniques resemble those long practiced in agriculture. They include establishing and thinning a desirable young stand; propagating the more productive species and genetic varieties; providing short rotations and complete fiber utilization; and controlling insects and diseases (fig. 12). Even though timber crops require decades to grow, the goal of intensive management is similar to the goal of intensive agriculture. This goal is to produce the greatest yield of the most valuable crop as quickly as possible.

Commercial forests cover about 225,121 acres, or about 66 percent of the land area of Granville County (16). Commercial forest is land that is producing or is capable of producing crops of industrial wood and that has not been withdrawn from timber production. Loblolly pine is the most important timber species in the county because it grows fast, is adapted to the soil and climate, brings the highest average sale value per acre, and is easy to establish and manage.

In Granville County, pines are important to the furniture industry and as sawtimber for home construction. Hardwoods have become increasingly valuable for lumber production, as hardwood flooring, veneers, and tool handles, and as pulp for the paper industry. Chips and smaller wood pieces are used for pulp paper and composite wood products, such as waferboard used in the building industry. Chips, bark, dust, and residues are used as pulp and for landscaping.

For purposes of forest inventory, the predominant forest types identified in Granville County are described in the following paragraphs (16).

*Loblolly-shortleaf.* This forest type covers 84,541 acres. It is predominantly loblolly pine, shortleaf pine, or other kinds of southern yellow pine (excluding longleaf pine and slash pine) or a combination of these species. Commonly included trees are oak, hickory, and gum.

*Oak-pine.* This forest type covers 17,131 acres. It is predominantly hardwoods, usually upland oaks. Pine species make up 25 to 50 percent of the stand. Commonly included trees are gum, hickory, and yellow-poplar.

*Oak-hickory.* This forest type covers 109,745 acres. It is predominantly upland oaks or hickory, or both. Commonly included trees are yellow-poplar, elm, maple, and black walnut.

*Oak-gum-cypress.* This forest type covers 10,278 acres. It is bottom-land forest consisting predominantly



**Figure 12.—A well managed stand of loblolly pine on Georgeville silt loam, 2 to 6 percent slopes.**



of tupelo, blackgum, sweetgum, oaks, southern cypress, or a combination of these species. Commonly included trees are cottonwood, willow, ash, elm, hackberry, and maple.

*Elm-ash-cottonwood.* This forest type covers 3,426 acres. It is predominantly elm, ash, cottonwood, or a combination of these species. Commonly included trees are willow, sycamore, beech, and maple.

One of the first steps in planning intensive woodland management is to determine the potential productivity of the soil for several alternative tree species. The most productive and valued trees are then selected for each soil type. Site and yield information enables a forest manager to estimate future wood supplies. These estimates are the basis of realistic decisions concerning expenses and profits associated with intensive woodland management, land acquisition, or industrial investments.

The potential productivity of woodland depends on physiography, soil properties, climate, and the effects of past management. Specific soil properties and site characteristics, including soil depth, texture, structure, and depth to the water table, affect forest productivity primarily by influencing available water capacity, aeration, and root development. The net effects of the interaction of these soil properties and site characteristics determine the potential site productivity.

Other site factors are also important. The gradient and length of slopes affect water movement and availability. The amount of rainfall and length of growing season influence site productivity.

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to applications of fertilizer than others, and some are more susceptible to erosion after roads are built and timber is harvested. Some soils require special reforestation efforts. In the section "Detailed Soil Map Units," the description of each map unit in the survey area suitable for timber includes information about productivity, limitations in harvesting timber, and management concerns in producing timber. Table 6 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight*, *moderate*, and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

Table 6 lists the *ordination symbol* for each soil. The first part of the ordination symbol, a number, indicates the potential productivity of a soil for the indicator species in cubic meters per hectare per year. The larger the number, the greater the potential productivity. Potential productivity is based on the site index and the point where mean annual increment is the greatest.

The second part of the ordination symbol, a letter,

indicates the major kind of soil limitation affecting use and management. The letter *R* indicates a soil that has a significant limitation because of the slope. The letter *X* indicates that a soil has restrictions because of stones or rocks on the surface. The letter *W* indicates a soil in which excessive water, either seasonal or year-round, causes a significant limitation. The letter *T* indicates a soil that has, within the root zone, excessive alkalinity or acidity, sodium salts, or other toxic substances that limit the development of desirable trees. The letter *D* indicates a soil that has a limitation because of a restricted rooting depth, such as a shallow soil that is underlain by hard bedrock, a hardpan, or other layers that restrict roots. The letter *C* indicates a soil that has a limitation because of the kind or amount of clay in the upper part of the profile. The letter *S* indicates a dry, sandy soil. The letter *F* indicates a soil that has a large amount of coarse fragments. The letter *A* indicates a soil having no significant limitations that affect forest use and management. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation or harvesting activities expose the soil. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion-control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of moderate or severe indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning harvesting and reforestation activities, or the use of special equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, stoniness, and susceptibility of the surface layer to compaction and rutting. As slope gradient and length increase, the use of wheeled equipment becomes more difficult. On the steeper slopes, more sophisticated systems are needed. The rating is *slight* if equipment use is restricted by wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are so steep that wheeled equipment cannot be operated safely across the slope, if wetness restricts equipment use from 2 to 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction and rutting. The rating is *severe* if slopes are so steep that tracked equipment cannot be operated safely across the slope, if wetness restricts equipment use for more than 6 months per year, if stoniness restricts the use of ground-based equipment,

or if special equipment is needed to prevent or minimize compaction. Ratings of moderate or severe indicate a need to choose the best suited equipment and to carefully plan the timing of harvesting and other management activities.

Ratings of *seedling mortality* refer to the probability of the death of the naturally occurring or properly planted seedlings of good stock in periods of normal rainfall, as influenced by kinds of soil or topographic features. Seedling mortality is caused primarily by too much water or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, rooting depth, and the aspect of the slope. The mortality rate generally is highest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of moderate or severe indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such as bedding, furrowing, installing a surface drainage system, and providing artificial shade for seedlings. Reinforcement planting is often needed if the risk is moderate or severe.

Ratings of *windthrow hazard* indicate the likelihood that trees will be uprooted by the wind. A restricted rooting depth is the main reason for windthrow. The rooting depth can be restricted by a high water table, a fragipan, or bedrock or by a combination of such factors as soil wetness, texture, structure, and depth. The risk is *slight* if strong winds break trees but do not uproot them; *moderate* if strong winds blow a few trees over and break many trees; and *severe* if moderate or strong winds commonly blow trees over. Ratings of moderate or severe indicate that care is needed in thinning or that the stand should not be thinned at all. Special equipment may be needed to prevent damage to shallow root systems in partial cutting operations. A plan for the periodic removal of windthrown trees and the maintenance of a road and trail system may be needed.

Ratings of *plant competition* indicate the likelihood of the growth or invasion of undesirable plants. Plant competition is more severe on the more productive soils, on poorly drained soils, and on soils having a restricted root zone that holds moisture. The risk is *slight* if competition from undesirable plants hinders adequate natural or artificial reforestation but does not necessitate intensive site preparation and maintenance. The risk is *moderate* if competition from undesirable

plants hinders natural or artificial reforestation to the extent that intensive site preparation and maintenance are needed. The risk is *severe* if competition from undesirable plants prevents adequate natural or artificial reforestation unless the site is intensively prepared and maintained. A moderate or severe rating indicates the need for site preparation to ensure the development of an adequately stocked stand. Managers should plan site preparation measures to ensure timely reforestation.

The *potential productivity of common trees* on a soil is expressed as a *site index* and a *volume* number. The predominant common trees are listed in table 6 in the order of their observed occurrence. Generally, only two or three tree species dominate. The first tree listed for each soil is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most productive on a given soil.

For soils that are commonly used for timber production, the yield is predicted in cubic feet per acre per year. It is predicted at the point where mean annual increment culminates. The estimates of the productivity of the soils in this survey are based mainly on loblolly pine, shortleaf pine, and yellow-poplar (3, 4, 6). Productivity is also based on site index data from upland oaks (11).

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years (50 years in this survey). This index applies to fully stocked, even-aged, unmanaged stands. Productivity of a site can be improved through management practices, such as bedding, ditching, managing water, applying fertilizer, and planting genetically improved species.

The *volume* is the yield likely to be produced by the most important trees, expressed in cubic feet per acre per year.

*Trees to plant* are those that are used for reforestation or, under suitable conditions, natural regeneration. They are suited to the soils and can produce a commercial wood crop. The desired product, topographic position (such as a low, wet area), and personal preference are three factors among many that can influence the choice of trees for use in reforestation.

## Recreation

In table 7, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil



features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 7, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 7 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 10 and interpretations for dwellings without basements and for local roads and streets in table 9.

*Camp areas* require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

*Picnic areas* are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes, stones, or boulders that increase the cost of shaping sites or of building access roads and parking areas.

*Playgrounds* require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed,

the depth of the soil over bedrock should be considered.

*Paths and trails* for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

*Golf fairways* are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

## Wildlife Habitat

John P. Edwards, biologist, Natural Resources Conservation Service, and Larry Warlick, wildlife biologist, North Carolina Wildlife Commission, helped prepare this section.

Granville County has a diversity of wildlife habitat. It provides habitat particularly suited to small game species, such as quail, rabbit, dove, and squirrel. Soils throughout the county are generally well suited to the establishment and growth of most native and introduced plants used for wildlife food and cover.

Deer and turkey are the largest species in Granville County. The deer population is well distributed and adequate throughout the county. Continued harvest is necessary to prevent overpopulation. Corn, soybeans, and forage grasses provide an abundant food supply for deer. Deer use areas of cover crops during winter. Densely wooded areas of Wehadkee soils on flood plains support good vegetative cover for deer. Turkey inhabit the county to a lesser extent than deer. Turkey mainly inhabit areas of the less accessible hardwood tracts in the western third of the county.

The beaver population is the largest population of fur-bearing animals in the county. Areas of Chewacla and Wehadkee soils on flood plains along the smaller streams provide excellent habitat for beaver (fig. 13). In some areas the number of beaver has increased so much that many landowners consider the animals pests. Beaver ponds, however, provide natural sediment basins, irrigation ponds, and some of the most diverse habitat for wetland wildlife.

Waterfowl populations in Granville County are generally good. They are greatest along creeks and rivers, especially those dammed by beaver. Areas of Wehadkee soils along the Tar River, Fishing Creek,



**Figure 13.—An area of Chewacla and Wehadkee soils, 0 to 2 percent slopes, frequently flooded, that provides excellent habitat for wildlife, such as beaver.**

Grassy Creek, and other large creeks provide good habitat for waterfowl. In addition to this stream habitat, Lake Devin, Lake Rogers, Lake Holt, the headwaters of Falls and Kerr Reservoirs, and approximately 2,800 farm ponds provide habitat for waterfowl. The potential population of wood ducks is high in these areas if proper cover and water levels are maintained. Properly installing nest boxes in areas of streams, ponds, and lakes also promotes the population of wood ducks. Migratory species, such as mallards, black ducks, and

Canada geese, are also common during winter.

The distribution of soils in Granville County creates an agricultural pattern that is very favorable to resident wildlife species. Conservation practices, including the establishment of field borders, stripcropping, and the conversion of highly erodible cropland to areas of grassland, trees, and wildlife plantings, help to provide food and cover for wildlife. Relatively small farms that have a good combination of cropland and woodland provide an abundance of edge habitat. Because of the

diversity of soil types, farming techniques, conservation practices, row crops, and woodland types, a healthy environment can be created for all wildlife species inhabiting the county.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting the appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. Generally, native plants provide the best source of food and cover for wildlife.

In table 8, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat. The ratings in the table are intended to be used as a guide and are not site specific. Onsite investigation is needed for individual management plans.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

*Grain and seed crops* are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

*Grasses and legumes* are domestic perennial grasses

and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

*Wild herbaceous plants* are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, and pokeberry.

*Hardwood trees* and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are autumn-olive and crabapple.

*Coniferous plants* furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

*Wetland plants* are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cattail, rushes, sedges, and reeds.

*Shallow water areas* have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

*Habitat for openland wildlife* consists of cropland, pasture, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild

herbaceous plants. Wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, cottontail rabbit, and red fox.

*Habitat for woodland wildlife* consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and whitetail deer.

*Habitat for wetland wildlife* consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

## Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

*Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.*

*The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.*

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt

fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

## Building Site Development

Table 9 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

*Shallow excavations* are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock or a very firm dense layer, stone content, soil texture, and slope. The time of the year that excavations can be made is affected by the depth to a

seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to water table.

*Dwellings and small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, and shrinking and swelling can cause the movement of footings. The depth to a high water table, depth to bedrock, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

*Local roads and streets* have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock, depth to a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic-supporting capacity.

*Lawns and landscaping* require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, depth to a high water table, depth to bedrock, and the available water capacity in the upper 40 inches affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established. Soil tests are essential to determine liming and fertilizer needs. Help in making soil tests or in deciding what soil additive, if any, should be used can be obtained from the office of the Granville County Soil and Water Conservation District or the local office of the North Carolina Cooperative Extension Service.

### Sanitary Facilities

Table 10 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and

limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 10 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

*Septic tank absorption fields* are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a high water table, depth to bedrock, and flooding affect absorption of the effluent. Large stones and bedrock interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

*Sewage lagoons* are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. The animal waste lagoons commonly used in farming operations are not considered in the ratings. They are generally deeper than the lagoons referred to in the table and rely on anaerobic bacteria to decompose waste materials.

Table 10 gives ratings for the natural soil that makes



up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to a high water table, depth to bedrock, flooding, and large stones.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope or bedrock can cause construction problems, and large stones can hinder compaction of the lagoon floor.

*Sanitary landfills* are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 10 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, depth to a water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, and soil reaction affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

*Daily cover for landfill* is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material may be obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil

material remaining in the borrow area must be thick enough over bedrock or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

### Construction Materials

Table 11 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good*, *fair*, or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

*Roadfill* is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, depth to a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* have more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1



to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. These soils have layers of suitable material, but the material is less than 3 feet thick.

*Sand* and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 11, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale, siltstone, and weathered granite saprolite, are not considered to be sand and gravel.

*Topsoil* is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, depth to a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, depth to a water table, rock fragments, depth to bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are naturally fertile or respond well to fertilizer and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel or stones, or soils that

have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel or stones, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and releases a variety of plant nutrients as it decomposes.

### Water Management

Table 12 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives the restrictive features that affect each soil for drainage, irrigation, terraces and diversions, and grassed waterways.

*Pond reservoir areas* hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area. Ponds that are less than about 2 acres in size are not shown on the soil maps because of the scale of mapping.

*Embankments, dikes, and levees* are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth greater than the height of the embankment can affect performance and safety of the embankment.

Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders. Depth to a high water table affects the amount of usable material. It also affects trafficability.

*Drainage* is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock or to other layers that affect the rate of water movement, permeability, depth to a high water table or depth of standing water if the soil is subject to ponding, slope, and susceptibility to flooding. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity. Availability of drainage outlets is not considered in the ratings.

*Federal and State regulations require that any area designated as wetlands cannot be altered without prior approval. Contact the local office of the Natural Resources Conservation Service for identification of hydric soils and potential wetlands.*

*Irrigation* is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock. The performance of a system is affected by the availability of suitable irrigation water, the depth of the root zone, and soil reaction.

*Terraces and diversions* are embankments or a combination of channels and ridges constructed across a slope to help control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock affect the construction of terraces and diversions. Maintenance of terraces and diversions is adversely affected by a restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability.

*Grassed waterways* are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

# Soil Properties

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Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed (19). During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 19.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

## Engineering Index Properties

Table 13 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

*Depth* to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

*Texture* is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages, by weight, of sand, silt, and clay in the fraction of the soil that is less than 2

millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, by volume, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

*Classification* of the soils is determined according to the Unified soil classification system (2) and the system adopted by the American Association of State Highway and Transportation Officials (1).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20, or higher, for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 19.

*Rock fragments* larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-

weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

*Percentage (of soil particles) passing designated sieves* is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

*Liquid limit and plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

## Physical and Chemical Properties

Table 14 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

*Clay* as a soil separate, or component, consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence the shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

*Moist bulk density* is the weight of soil (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at  $\frac{1}{3}$ -bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

*Permeability* refers to the ability of a soil to transmit

water or air. The estimates indicate the rate of movement of water through the soil when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

*Available water capacity* refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage in each major soil layer is stated in inches of water per inch of soil. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time. It is the difference between the amount of soil water at field moisture capacity and the amount at wilting point.

*Soil reaction* is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

*Shrink-swell potential* is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, more than 9 percent, is sometimes used.

*Erosion factor K* indicates the susceptibility of a soil

to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

*Erosion factor T* is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons per acre per year.

*Organic matter* is the plant and animal residue in the soil at various stages of decomposition. In table 14, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

## Soil and Water Features

Table 15 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

*Hydrologic soil groups* are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep or very deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep to very deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil listed in table 15 is assigned to two hydrologic groups, the first letter is for drained areas and the second is for undrained areas.

*Flooding*, the temporary covering of the soil surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 15 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none*, *rare*, *occasional*, or *frequent*. *None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered is local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

*High water table* (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in



table 15 are the depth to the seasonal high water table; the kind of water table, that is, *perched* or *apparent*; and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 15.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

*Depth to bedrock* is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

*Risk of corrosion* pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and the amount of sulfates in the saturation extract.

## Physical and Chemical Analyses of Selected Soils

The results of physical analysis of two typical pedons in the survey area are given in table 16, and the results of chemical analysis are given in table 17. The data are for soils sampled at carefully selected sites. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." Soil samples were analyzed by the Soil Survey Laboratory Staff, Lincoln, Nebraska.

Most determinations, except those for grain-size analysis and bulk density, were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an oven-dry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods (19).

*Coarse materials*—(2-75 mm fraction) weight estimates of the percentages of all material less than 75 mm (3B1).

*Total sand*—(0.05-2.0 mm fraction) weight percentages of material less than 2 mm (3A1).

*Total silt*—(0.002-0.05 mm fraction) pipette extraction, weight percentages of all material less than 2 mm (3A1).

*Total clay*—(fraction less than 0.002 mm) pipette extraction, weight percentages of material less than 2 mm (3A1).

*Organic carbon*—wet combustion. Walkley-Black modified acid-dichromate, ferric sulfate titration (6A1c).

*Carbonate as calcium carbonate*—manometric, electronic (6E1g).

*Extractable cations*—ammonium acetate pH 7.0, atomic absorption; calcium (6N2e), magnesium (6O2d), sodium (6P2b), potassium (6Q2b).

*Extractable acidity*—barium chloride-triethanolamine IV (6H5a).

*Cation-exchange capacity*—ammonium acetate, pH 7.0, steam distillation (5A8b).

*Cation-exchange capacity*—sum of cations (5A3a).

*Base saturation*—ammonium acetate, pH 7.0 (5C1).

*Base saturation*—sum of cations, TEA, pH 8.2 (5C3).

*Reaction (pH)*—1:1 water dilution (8C1f).

*Reaction (pH)*—potassium chloride (8C1g).

*Aluminum*—potassium chloride extraction (6G9).

## Mineralogy of Selected Soils

The determinations of mineralogy for two typical pedons in the survey area are given in table 18. The pedons are typical of the series and are described in



the section "Soil Series and Their Morphology." Soil samples were analyzed by the Soil Survey Laboratory Staff, Lincoln, Nebraska.

The determinations in table 18 were made on particles less than 0.002 millimeters in size (clay particles). The following method was used in obtaining the data. The code in parentheses refers to the published method (19).

*Clay mineralogy*—x-ray diffraction (7A2i).

### **Engineering Index Test Data**

Table 19 shows laboratory test data for a typical pedon sampled at a carefully selected site in the survey area. The pedon is typical of the series and is described

in the section "Soil Series and Their Morphology." The soil sample was tested by the North Carolina Department of Transportation and Highway Safety, Materials and Test Unit, Raleigh, North Carolina.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are Unified classification—D 2487 (ASTM); AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Mechanical analysis—T 88 (AASHTO), D 422 (ASTM), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 4318 (ASTM); Plasticity index—T 90 (AASHTO), D 4318 (ASTM); and Moisture density—T 99 (AASHTO), D 698 (ASTM).



# Formation of the Soils

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This section describes the factors of soil formation and relates them to the soils in Granville County. It also provides information about the general geology and soil parent materials in the county.

## Factors of Soil Formation

The characteristics of a soil are determined by the combined influence of parent material, climate, relief, time, and plant and animal life. These five factors achieve their influence by a variety of processes. The processes of soil formation include additions of organic and mineral material to the soil as solids, liquids, and gasses; losses of these materials from the soil; translocation of materials in the soil; and transformation of mineral and organic substances in the soil (5).

### Parent Material

Parent material is the unconsolidated mass in which a soil forms. In Granville County, it is a major factor in determining what kind of soil forms and can be correlated to geologic formations (fig. 14). The general soil map is an approximate guide to the geology of the county. Parent material is largely responsible for the differences in texture, mineralogy, and chemistry that make a soil unique.

### Climate

Climatic factors, particularly precipitation and temperature, affect the physical, chemical, and biological relationships in the soil. They influence the rate at which rocks weather and organic matter decomposes. The amount of leaching in a soil is related to the amount of rainfall and the movement of water through the soil. The effects of climate also control the kinds of plants and animals living in and on the soil. Temperature influences the rate of growth of organisms and the speed of chemical and physical reactions in the soil.

Granville County generally has a warm, humid climate. Because variations in climate throughout the county are small, climate probably has not caused major local differences between soils. The mild

temperatures and the abundant rainfall during most years promote the rapid growth of plants and the rapid decomposition of organic matter, hasten chemical reactions, speed the leaching of soluble bases, and increase the translocation of the less soluble, fine-textured particles in the soil profile. Consequently, many of the soils in the county are acid throughout, strongly leached, and low in base saturation.

### Relief

Relief influences free drainage, surface runoff, soil temperature, and the extent of geologic erosion. The relief in Granville County is largely the result of dissection by the Tar River, Knapp of Reeds Creek, Grassy Creek, and their tributaries. The degree of dissection of the landscape affects soil formation by influencing the depth of the water table and the rate of geologic erosion. On convex ridges and hill slopes in well dissected areas, soils have a deep water table and a brightly colored B horizon. Examples are Appling, Cecil, Georgeville, Herndon, Vance, and Wedowee soils. In the slightly dissected areas, such as on broad interstream divides, at the head of drainageways, and on the lower hill slopes, soils commonly have a perched water table and a B horizon that has a gray matrix or gray mottles. Examples are Creedmoor, Helena, Iredell, Lignum, and Picture soils. Soils on flood plains receive runoff from adjacent areas and have a water table at or near the surface. These soils commonly have a dark colored A horizon and a gray B horizon that may have brightly colored mottles. Examples are Chewacla and Wehadkee soils.

Relief can also affect the depth of soil development. In areas where the slope is more than 15 percent, geologic erosion removes soil material almost as fast as it forms. As a result, most of the strongly sloping to steep soils have a thinner solum than the less sloping soils. Examples are Pacolet, Tatum, Nason, Rion, and Wateree soils.

### Time

The length of time that soil material has been exposed to the soil-forming processes accounts for

Parent Rock System	Geology and Dominant Rock Type	Dominant Rocks	Clay Mineralogy of the soils	Surface Texture	General Soil Map Symbol and Dominant Soils
Durham Triassic Basin	Interbedded sedimentary rocks	Arkosic sandstone	Mixed Mixed <sup>1</sup>	Loamy-sandy	3. Creedmoor Mayodan <sup>3</sup> Pinkston <sup>3</sup>
	Mafic intrusives	Unmetamorphosed diabase dikes and sills	Mixed-montmorillonitic	Loamy	7. Iredell Picture Enon
Carolina Slate Belt	Felsic volcanics	Interbedded rhyolitic flows and felsic tuffs	Mixed-kaolinitic	Silty-loamy	2. Nason Herndon Lignum Tatum <sup>3</sup>
	Mixed felsic and mafic volcanics	Interbedded metamorphosed andesitic to mafic tuffs and flows	Mixed-kaolinitic	Silty-loamy	5. Georgeville Herndon Tatum <sup>3</sup>
	Metamorphosed felsic intrusives	Mixtures of granite, quartz monzonite, and granodiorite	Mixed-kaolinitic	Loamy	6. Vance Helena Appling <sup>3</sup>
	Metamorphosed and unmetamorphosed felsic intrusives	Individual bodies of mixed quartz monzonite, granite, and granodiorite	Kaolinitic	Loamy	1. Cecil Pacolet <sup>3</sup> Appling <sup>3</sup>
	Mafic intrusives	Gabbro and diorite	Mixed-montmorillonitic	Loamy	4. Iredell Enon
Raleigh Belt	Metamorphosed felsic intrusives	Mixtures of granitic gneiss, mica schist, and mica gneiss	Kaolinitic  Mixed <sup>1</sup>	Loamy	1. Cecil Pacolet <sup>3</sup> Appling <sup>3</sup> Wedowee <sup>3</sup>  8. Wedowee Rion Wateree
	Mafic intrusives	Gabbro and diorite	Mixed-montmorillonitic	Loamy	4. Iredell Enon
Alluvium <sup>2</sup>	Silty and loamy sediments	---	Mixed <sup>1</sup>	Silty-loamy	Altavista Chewacla Wehadkee Congaree

<sup>1</sup> Based on mineralogy of the fine sand fraction.

<sup>2</sup> Alluvial units are too small to be delineated on the General Soil Map.

<sup>3</sup> These soils comprise less than 10 percent of the General Soil Map Unit.

**Figure 14.—The relationship of parent rock systems to geology and soils.**

some differences between soils. The formation of a well defined profile, however, depends on other factors. Less time is required for a profile to develop in a warm,

humid area where the plant cover is dense, as in Granville County, than in a cold, dry area where the plant cover is sparse.

Soils vary considerably in age. The length of time that a soil has been developing is reflected in the profile. Old soils generally have better defined horizons than young soils. In Granville County, the effects of time as a soil-forming factor are more apparent in the older soils, such as Cecil and Appling, which are in the more stable landscape positions on uplands. These soils have more distinct horizons than Chewacla and Wehadkee soils, which are on flood plains. Chewacla and Wehadkee soils have not been in place long enough to have developed distinct horizons. They are considered young because of their topographic position.

### Plant and Animal Life

Plants and animals determine the kinds of organic matter and how the organic matter is incorporated into the soil. Organic matter is the primary nutrient and energy reservoir for many soils. Plants release organic and inorganic compounds that affect the chemical breakdown of minerals in the soil. They take up nutrients from the lower horizons and, when their foliage dies, deposit them on the surface. Plant roots improve soil structure and porosity and physically hold soil material in place. Plant foliage protects the soil

surface and thus reduces the hazards of wind erosion and water erosion.

Animals and insects transfer soil particles from one horizon to another. Like plants, earthworms and micro-organisms aid the chemical breakdown of minerals and improve soil structure and porosity.

### General Geology and Soil Parent Materials

The soils of Granville County formed from primarily three parent rock systems. These systems are the Durham Triassic Basin, the Carolina Slate Belt, and the Raleigh Belt (8, 22).

#### Durham Triassic Basin

The Durham Triassic Basin is located in the southern part of Granville County. It makes up about 20 percent of the county. The basin formed approximately 200 million years ago during the Triassic Period (22). Displacement of the land west of the Jonesboro Fault, which runs in a northwest- and southeast-trending line between Corinth and Wilton, produced the large trough known as the Durham Basin. Erosion in the higher areas east and west of the basin produced large

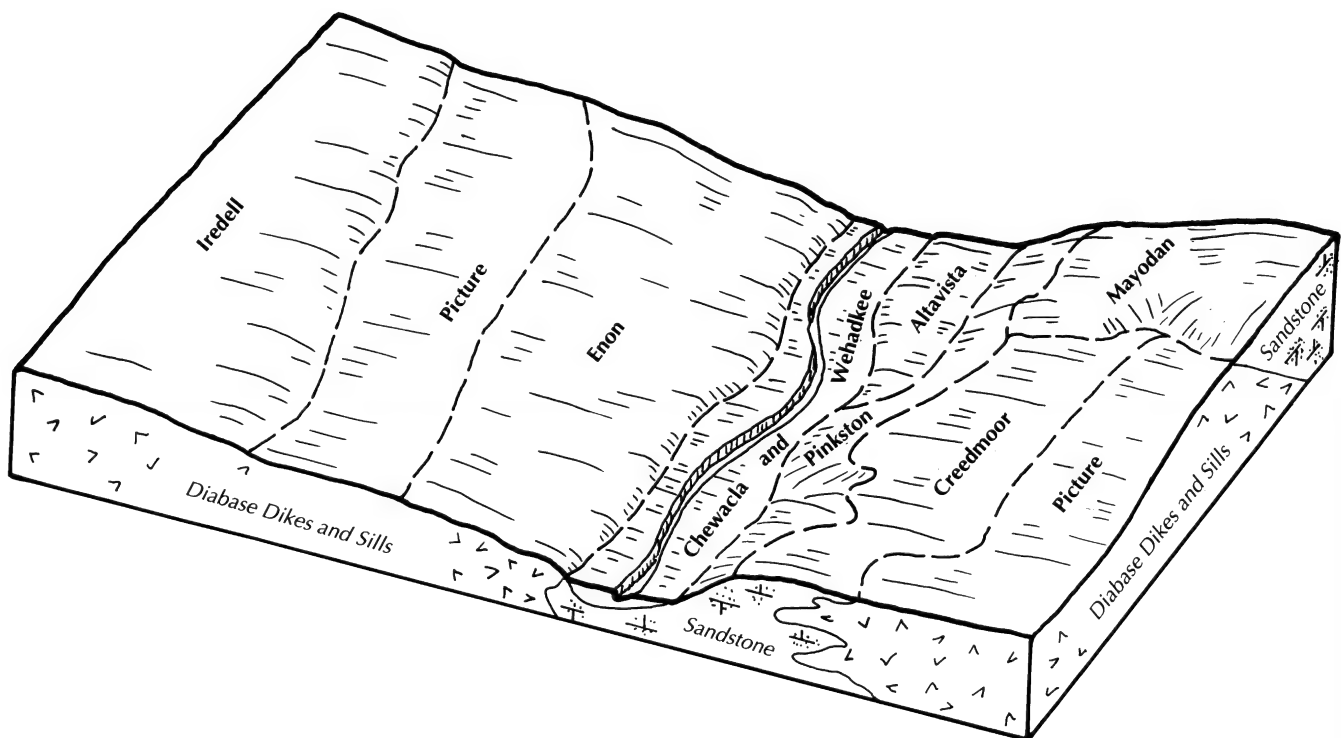


Figure 15.—The relationship of soils, landscape, and geology in the Durham Triassic Basin.

amounts of sediments, which accumulated in the fault trough. Compaction of these sediments formed the major rock types of the Durham Triassic Basin. In Granville County, the basin is mostly comprised of arkosic sandstone and in areas includes interbedded claystones, siltstones, shale, sandstones, and conglomerates. Fanglomerates also occur in areas along the eastern and northern boundaries of the basin. Several diabase dikes and sills have intruded the basin either during or after the filling of the basin.

The major soils that formed in residuum weathered from bedrock of the Durham Triassic Basin are Creedmoor, Mayodan, and Pinkston soils, and, in areas of diabase dikes and sills, Iredell, Enon, and Picture soils (fig. 15). Creedmoor, Mayodan, Iredell, Enon, and Picture soils have a clayey subsoil, mixed or montmorillonitic mineralogy, and a high or very high shrink-swell potential. Pinkston soils have a loamy

subsoil. They formed on steep slopes where the depth to Triassic bedrock is less than about 3 feet.

### Carolina Slate Belt

The Carolina Slate Belt makes up more than 75 percent of Granville County. The major rock types occur as three northeast- and southwest-trending parallel bands. Mixed felsic and mafic volcanic rocks make up the northern band, felsic volcanic rocks make up the central band, and metamorphosed felsic intrusive rocks make up the southern band. Separating soil types within the Carolina Slate Belt is difficult because of the local variation in type, composition, and distribution of the rocks within the three bands. Certain soil types, however, are prevalent within each area.

Georgeville and Herndon soils are the major soils in the northern band (fig. 16), Nason, Lignum, and Tatum soils are the major soils in the central band, and Vance

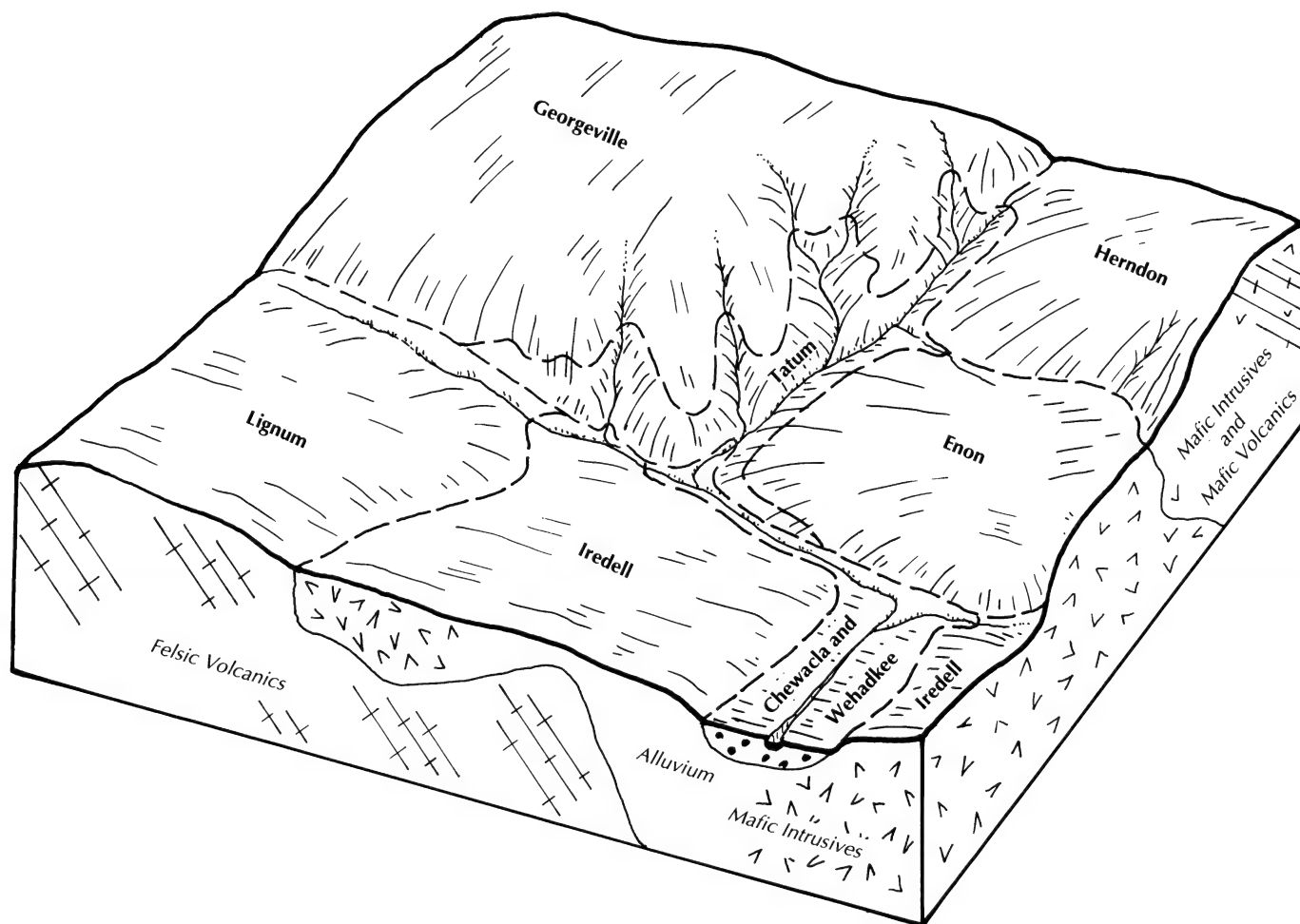


Figure 16.—The relationship of soils, landscape, and geology in the Carolina Slate Belt.



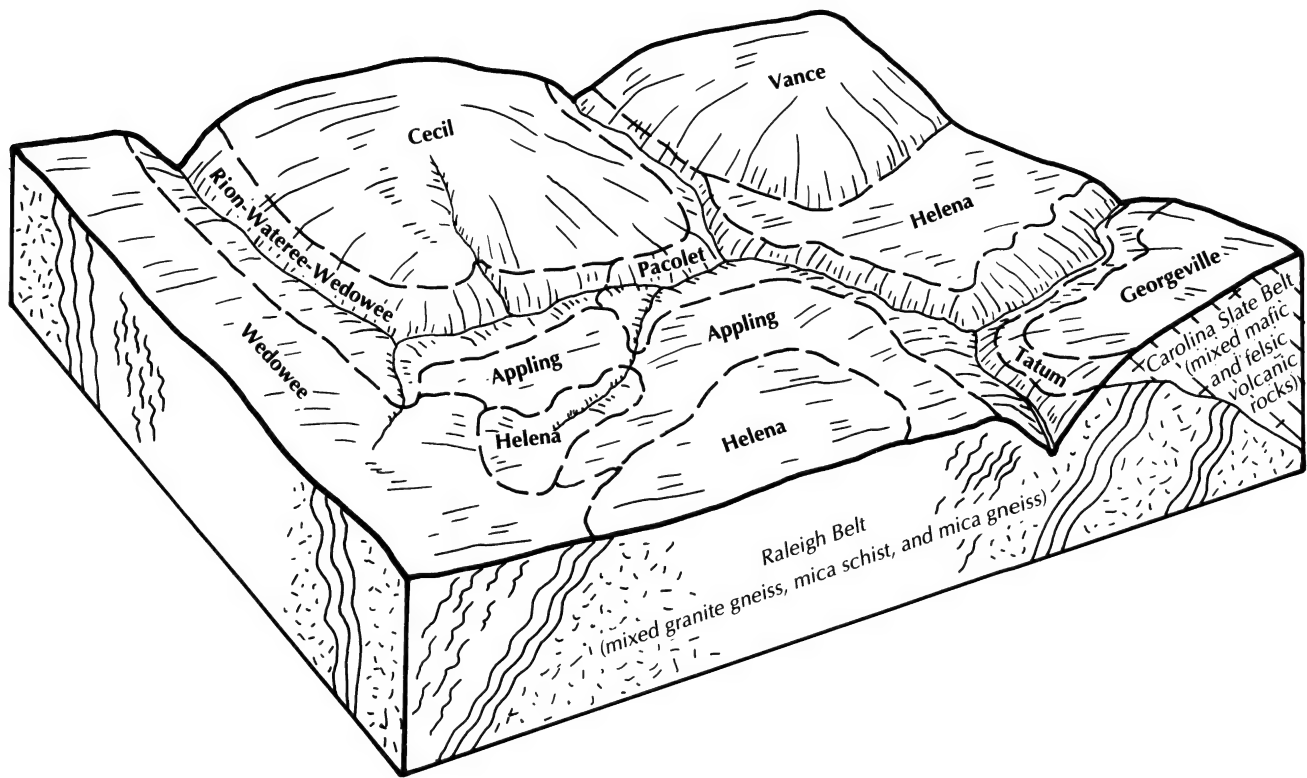


Figure 17.—The relationship of soils, landscape, and geology in the Raleigh Belt and Carolina Slate Belt.

and Helena soils are the major soils in the southern band. Within the southern band are areas of granitic-rich rock. Vance and Helena soils, which commonly occur in these areas, have a solum that has a higher content of sand than that of Georgeville, Herndon, Nason, Tatum, and Lignum soils. Generally, Georgeville, Herndon, Nason, Tatum, and Lignum soils occur in areas of schistose rocks. They have a higher content of silt than Vance and Helena soils.

#### Raleigh Belt

The Raleigh Belt makes up about 5 percent of Granville County. The belt consists of rocks that are predominantly mixed felsic intrusive rocks, such as

granite gneiss and mica schist. Cecil, Pacolet, Appling, Wedowee, Rion, and Wateree soils generally are the dominant soils in the Raleigh Belt (fig. 17). They have a higher content of sand, have a lower shrink-swell potential, and are more permeable than the soils typical of the Carolina Slate Belt.

Pockets of mafic intrusive rocks, such as gabbro and diorite, or a mixture of both, are scattered throughout the county. Small areas of unaltered plutons and ultramafic rock, such as metamorphosed dunite and peridotite, occur in the southeastern part of the county, near the eastern boundary of the Triassic Basin. Iredell and Enon soils are associated with areas of these rocks.



# Classification of the Soils

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The system of soil classification used by the National Cooperative Soil Survey has six categories (18). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 20 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

**ORDER.** Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

**SUBORDER.** Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning humid climate, plus *ult*, from Ultisol).

**GREAT GROUP.** Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludults (*Hapl*, meaning minimal horizon development, plus *udult*, the suborder of the Ultisols that occurs in humid climates).

**SUBGROUP.** Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludults.

**FAMILY.** Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is clayey, mixed, thermic Typic Hapludults.

**SERIES.** The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the substratum within a series. The Nason series is an example of clayey, mixed, thermic Typic Hapludults in the survey area.

## Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The location of the typical pedon is described, and coordinates generally are identified by the State plane grid system or by longitude and latitude. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" (20). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (18). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

## Altavista Series

*Depth class:* Very deep

*Drainage class:* Moderately well drained

*Permeability:* Moderate

*Parent material:* Alluvial sediments

*Landscape:* Piedmont drainageways

*Landform:* Low stream terraces

*Slope:* 0 to 3 percent

*Taxonomic class:* Fine-loamy, mixed, thermic Aquic  
Hapludults

### Typical Pedon

Altavista loam, 0 to 3 percent slopes, rarely flooded; 1.3 miles east of Creedmoor on North Carolina Highway 56, about 400 feet east of the intersection of North Carolina Highway 56 and a power line, in an area of woodland; Creedmoor USGS topographic quadrangle; lat. 36 degrees 07 minutes 16 seconds N. and long. 78 degrees 39 minutes 51 seconds W.

Oe—1 inch to 0; partially decomposed hardwood leaf litter.

A—0 to 8 inches; grayish brown (10YR 5/2) loam; weak medium granular structure; very friable; common medium and coarse roots; strongly acid; clear smooth boundary.

E—8 to 20 inches; brown (10YR 5/3) sandy loam; weak medium subangular blocky structure; very friable; few fine and medium roots; very strongly acid; gradual wavy boundary.

BE—20 to 24 inches; light yellowish brown (10YR 6/4) sandy clay loam; weak medium subangular blocky structure; very friable; few fine roots; very strongly acid; gradual wavy boundary.

Bt1—24 to 30 inches; light yellowish brown (2.5Y 6/4) sandy clay loam; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt2—30 to 44 inches; light yellowish brown (2.5Y 6/4) clay loam; common medium prominent strong brown (7.5YR 6/8) irregularly shaped masses of iron accumulation with clear boundaries throughout; few fine distinct light brownish gray (10YR 6/2) irregularly shaped iron depletions with sharp boundaries in the matrix; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

BCg—44 to 57 inches; light yellowish brown (10YR 6/2) sandy clay loam; common fine distinct strong brown (7.5YR 6/8) irregularly shaped masses of iron accumulation with clear boundaries throughout; weak coarse subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

Cg1—57 to 65 inches; light gray (10YR 7/1) sandy clay

loam that has pockets of sandy clay; massive; friable; extremely acid; gradual wavy boundary.

Cg2—65 to 72 inches; light gray (10YR 7/1) sandy clay loam that has pockets of sandy clay becoming stratified with increasing depth; common medium distinct brownish yellow (10YR 6/6) and strong brown (7.5YR 6/8) irregularly shaped masses of iron accumulation with clear boundaries throughout; massive; very friable; extremely acid.

### Range in Characteristics

*Thickness of the solum:* 30 to more than 60 inches

*Depth to bedrock:* More than 60 inches; commonly more than 120 inches

*Content of mica flakes:* None to common in the B and C horizons

*Content and size of rock fragments:* Less than 5 percent by volume in the A and B horizons and less than 35 percent in the C horizon; mostly gravel

*Reaction:* Extremely acid to moderately acid throughout the profile, except where the surface layer has been limed

*A or Ap horizon:*

Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 1 to 4

Texture—loam

*E horizon:*

Color—hue of 10YR to 2.5Y, value of 5 to 7, and chroma of 3 to 8

Texture—loamy sand, loamy fine sand, sandy loam, fine sandy loam, very fine sandy loam, loam, or silt loam

*BE horizon:*

Color—hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 to 8

Texture—sandy loam, fine sandy loam, loam, or sandy clay loam

*Bt horizon:*

Color—hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 to 8

Redoximorphic features—iron or clay depletions in shades of white, gray, or brown and iron accumulations in shades of yellow, brown, or red

Texture—loam, sandy clay loam, or clay loam

*BCg horizon:*

Color—hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2

Redoximorphic features—iron or clay depletions in shades of white, gray, or brown and iron accumulations in shades of yellow, brown, or red

Texture—loamy sand, loamy fine sand, sandy loam, fine sandy loam, loam, or sandy clay loam

**Cg horizon:**

Color—hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2

Redoximorphic features—iron or clay depletions in shades of white, gray, or brown and iron accumulations in shades of yellow, brown, or red

Texture—variable; commonly sandy loam, loam, sandy clay loam, clay loam, or sandy clay

## Appling Series

**Depth class:** Very deep

**Drainage class:** Well drained

**Permeability:** Moderate

**Parent material:** Residuum weathered from felsic intrusive rocks

**Landscape:** Piedmont uplands

**Landform:** Ridges and hill slopes

**Slope:** 2 to 10 percent

**Taxonomic class:** Clayey, kaolinitic, thermic Typic Kanhapludults

### Typical Pedon

Appling sandy loam, 2 to 6 percent slopes; 200 feet northwest of the intersection of Secondary Road 1602 and Henderson Street in Oxford, 100 feet east of a large farm pond, in a stand of loblolly pine; Oxford USGS topographic quadrangle; lat. 36 degrees 18 minutes 36 seconds N. and long. 78 degrees 34 minutes 26 seconds W.

**Ap**—0 to 6 inches; yellowish brown (10YR 5/4) sandy loam; weak fine granular structure; very friable; slightly sticky, nonplastic; many fine and coarse roots; moderately acid; clear smooth boundary.

**E**—6 to 11 inches; yellowish brown (10YR 5/4) sandy loam; weak fine subangular blocky structure; firm; slightly sticky, nonplastic; many fine and coarse roots; moderately acid; clear wavy boundary.

**Bt1**—11 to 23 inches; yellowish red (5YR 4/6) clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate coarse subangular blocky structure; firm; slightly sticky, moderately plastic; many fine roots; many distinct clay films on faces of peds and along root channels; very strongly acid; gradual wavy boundary.

**Bt2**—23 to 35 inches; yellowish red (5YR 4/6) clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate coarse subangular

blocky structure; firm; slightly sticky, moderately plastic; many fine roots; common faint clay films on faces of peds; strongly acid; gradual wavy boundary.

**BC1**—35 to 41 inches; yellowish red (5YR 4/6) clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; slightly sticky, moderately plastic; very strongly acid; gradual wavy boundary.

**BC2**—41 to 65 inches; yellowish red (5YR 4/6) sandy clay loam; few medium distinct very pale brown (10YR 7/3) mottles; weak fine subangular blocky structure; friable; slightly sticky, moderately plastic; very strongly acid.

### Range in Characteristics

**Thickness of the solum:** 40 to more than 60 inches

**Depth to bedrock:** More than 60 inches

**Content of mica flakes:** None to common in the A, E, and Bt horizons and none to many in the BC horizon

**Content and size of rock fragments:** Less than 15 percent by volume in the A horizon and less than 10 percent in the B horizon; mostly gravel

**Reaction:** Very strongly acid or strongly acid throughout the profile, except where the surface layer has been limed

**Ap or A horizon:**

Color—hue of 5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 6

Texture—sandy loam

**E horizon:**

Color—hue of 5YR to 2.5Y and value and chroma of 4 to 6

Texture—loamy coarse sand, loamy sand, coarse sandy loam, sandy loam, or fine sandy loam

**Bt horizon:**

Color—hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8

Mottles—shades of red, brown, or yellow

Texture—clay loam, sandy clay, or clay having some thin layers of sandy clay loam

**BC horizon:**

Color—hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8

Mottles—shades of red, brown, or yellow

Texture—sandy clay, clay loam, or sandy clay loam

**C horizon (if it occurs):**

Color—multicolored in shades of red, brown, yellow, or white

Texture—variable; commonly sandy loam, loam, clay loam, or sandy clay loam saprolite

## Cecil Series

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Parent material:* Residuum weathered from felsic intrusive rocks (fig. 18)

*Landscape:* Piedmont uplands

*Landform:* Ridges and hill slopes

*Slope:* 2 to 10 percent

*Taxonomic class:* Clayey, kaolinitic, thermic Typic Kanhapludults

### Typical Pedon

Cecil sandy loam, 2 to 6 percent slopes; 0.75 mile north of Wilton on North Carolina Highway 96, about 1.25 miles east on Secondary Road 1623, about 500 feet east on Secondary Road 1625, about 100 feet south of Grove Hill Church, in a pasture; Wilton USGS topographic quadrangle; lat. 36 degrees 10 minutes 00 seconds N. and long. 78 degrees 31 minutes 29 seconds W.

Ap—0 to 8 inches; strong brown (7.5YR 5/4) sandy loam; weak fine granular structure; very friable; slightly acid; abrupt smooth boundary.

Bt1—8 to 24 inches; red (2.5YR 4/8) clay; few fine prominent red (10R 4/8) and common fine prominent strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm; moderately sticky, moderately plastic; few faint clay films on faces of peds; moderately acid; gradual wavy boundary.

Bt2—24 to 40 inches; red (2.5YR 4/8) clay; few medium prominent strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm; moderately sticky, moderately plastic; few faint clay films on faces of peds; moderately acid; gradual wavy boundary.

BC—40 to 55 inches; red (2.5YR 4/8) clay loam; common medium pale yellow and white pockets of sandy loam saprolite; weak medium subangular blocky structure; friable; slightly sticky, slightly plastic; strongly acid; gradual wavy boundary.

C—55 to 65 inches; multicolored sandy loam saprolite in shades of red, yellow, and white; massive; friable; strongly acid.

### Range in Characteristics

*Thickness of the solum:* 40 to more than 60 inches

*Depth to bedrock:* More than 60 inches

*Content of mica flakes:* None to common in the Bt horizon and none to many in the BC and C horizons

*Content and size of rock fragments:* Less than 15 percent by volume in the A horizon and less than

10 percent in the B horizon; mostly gravel and cobbles

*Reaction:* Very strongly acid to moderately acid in the A horizon, except where limed, and strongly acid or very strongly acid in the B and C horizons

*Ap or A horizon:*

Color—hue of 2.5YR to 10YR, value of 3 to 5, and chroma of 2 to 8

Texture—sandy loam or clay loam

*Bt horizon:*

Color—commonly hue of 10R or 2.5YR, value of 4 or 5, and chroma of 6 to 8; also hue of 5YR in areas where mottles do not occur

Mottles—shades of red, brown, or yellow

Texture—clay loam, sandy clay, or clay

*BC horizon:*

Color—hue of 10R to 5YR, value of 4 to 6, and chroma of 4 to 8

Mottles—shades of yellow or brown

Texture—loam, sandy clay loam, or clay loam

*C horizon:*

Color—multicolored in shades of red, brown, yellow, white, or gray

Texture—variable; commonly sandy loam, loam, clay loam, or sandy clay loam saprolite

## Chewacla Series

*Depth class:* Very deep

*Drainage class:* Somewhat poorly drained

*Permeability:* Moderate

*Parent material:* Recent alluvial sediments

*Landscape:* Piedmont drainageways

*Landform:* Flood plains

*Slope:* 0 to 2 percent

*Taxonomic class:* Fine-loamy, mixed, thermic Fluvaquentic Dystrochrepts

### Typical Pedon

Chewacla loam in an area of Chewacla and Wehadkee soils, 0 to 2 percent slopes, frequently flooded; 0.5 mile east of the Durham-Granville County line on Secondary Road 1004, about 500 feet south of Secondary Road 1004, in an area of woodland; Lake Mitchie USGS topographic quadrangle; lat. 36 degrees 07 minutes 58 seconds N. and long. 78 degrees 48 minutes 04 seconds W.

A—0 to 6 inches; yellowish brown (10YR 4/4) loam; weak fine granular structure; very friable; few fine flakes of mica; slightly acid; clear wavy boundary.

Bw1—6 to 15 inches; yellowish brown (10YR 4/4) loam; weak fine and medium subangular blocky structure;



very friable; few fine flakes of mica; slightly acid; clear smooth boundary.

Bw2—15 to 19 inches; dark yellowish brown (10YR 4/4) loam; few fine distinct pale brown (10YR 6/3) irregularly shaped masses of iron accumulation with clear boundaries throughout; weak fine and medium subangular blocky structure; friable; few fine flakes of mica; slightly acid; gradual wavy boundary.

C—19 to 33 inches; dark brown (10YR 4/3) loam; common medium distinct gray (10YR 5/1) irregularly shaped iron depletions with clear boundaries in the matrix; massive; friable; few fine flakes of mica; slightly acid; gradual wavy boundary.

Cg—33 to 65 inches; light brownish gray (10YR 6/2) sandy loam; common medium distinct yellowish brown (10YR 5/4) irregularly shaped masses of iron accumulation with clear boundaries throughout; massive; very friable; few fine flakes of mica; strongly acid.

#### Range in Characteristics

*Thickness of the solum:* 15 to 70 inches

*Depth to bedrock:* More than 60 inches

*Content of mica flakes:* Few or common

*Content and size of rock fragments:* Less than 5 percent by volume in the A horizon and the upper part of the B horizon; mostly gravel or cobbles

*Reaction:* Very strongly acid to slightly acid in the upper 40 inches, except where the surface layer has been limed, and very strongly acid to slightly alkaline below a depth of 40 inches

#### A horizon:

Color—hue of 5YR to 10YR, value of 3 to 5, and chroma of 1 to 4

Texture—loam

#### Bw horizon:

Color—hue of 5YR to 2.5Y, value of 4 to 7, and chroma of 3 to 8

Texture—sandy loam, fine sandy loam, loam, sandy clay loam, clay loam, silt loam, or silty clay loam

Redoximorphic features—iron or clay depletions in shades of gray or brown and iron accumulations in shades of yellow, brown, or red

#### C horizon:

Color—hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 3 to 8

Mottles—shades of red, brown, or yellow

Texture (within a depth of 40 inches)—loamy

Texture (below a depth of 40 inches)—variable; ranging from extremely gravelly sand to clay

Redoximorphic features—iron or clay depletions in shades of gray or brown and iron accumulations in shades of yellow, brown, or red

#### Cg horizon:

Color—horizon is neutral in hue or has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 0 to 2

Texture (within a depth of 40 inches)—loamy

Texture (below a depth of 40 inches)—variable;

ranging from extremely gravelly sand to clay

Redoximorphic features—iron or clay depletions in shades of gray or brown and iron accumulations in shades of yellow, brown, or red

### Congaree Series

*Depth class:* Very deep

*Drainage class:* Moderately well drained and well drained

*Permeability:* Moderate

*Parent material:* Alluvial sediments

*Landscape:* Piedmont drainageways

*Landform:* Flood plains

*Slope:* 0 to 2 percent

*Taxonomic class:* Fine-loamy, mixed, nonacid, thermic Typic Udifluvents

#### Typical Pedon

Congaree silt loam, 0 to 2 percent slopes, frequently flooded; 7.0 miles southeast of Oxford on U.S. Highway 15, about 0.5 mile east on Secondary Road 1635, about 75 feet southwest of the Tar River, in a cultivated field; Stem USGS topographic quadrangle; lat. 36 degrees 13 minutes 18 seconds N. and long. 78 degrees 37 minutes 27 seconds W.

Ap—0 to 12 inches; yellowish brown (10YR 5/6) silt loam; weak coarse granular structure; friable; few fine roots; moderately acid; gradual wavy boundary.

C1—12 to 19 inches; yellowish brown (10YR 4/4) loam; massive; friable; few fine roots; moderately acid; gradual wavy boundary.

C2—19 to 25 inches; dark yellowish brown (10YR 4/4) silt loam; massive; friable; few fine roots; moderately acid; gradual wavy boundary.

C3—25 to 45 inches; dark yellowish brown (10YR 4/4) sandy loam; common coarse distinct yellowish brown (10YR 5/6) irregularly shaped masses of iron accumulation with clear boundaries throughout; massive; friable; few fine roots; moderately acid; gradual wavy boundary.

C4—45 to 65 inches; dark brown (10YR 4/3) loam; common medium distinct gray (10YR 6/1) irregularly shaped iron depletions with clear boundaries throughout and common medium prominent dusky red (10R 3/4) irregularly shaped masses of iron accumulation with clear boundaries throughout;

massive; friable; strongly acid; gradual wavy boundary.

C5—65 to 70 inches; 40 percent yellow (10YR 7/8), 30 percent gray (10YR 5/1), and 30 percent brown (10YR 5/3) fine sandy loam; massive; friable; iron depletions occurring as areas in shades of gray and iron accumulations occurring as areas in shades of yellow and brown; moderately acid; gradual wavy boundary.

C6—70 to 80 inches; 40 percent strong brown (10YR 4/6), 40 percent yellowish brown (10YR 5/8), and 20 percent gray (10YR 5/1) fine sandy loam; massive; friable; iron depletions occurring as areas in shades of gray and iron accumulations occurring as areas in shades of brown; moderately acid.

#### Range in Characteristics

*Thickness of the underlying material:* More than 60 inches

*Depth to bedrock:* More than 60 inches; commonly more than 120 inches

*Content of mica flakes:* None to many

*Content and size of rock fragments:* Less than 2 percent by volume; mostly gravel

*Reaction:* Very strongly acid to neutral throughout the profile, except where the surface layer has been limed

#### *Ap or A horizon:*

Color—hue of 5YR to 10YR, value of 4 or 5, and chroma of 2 to 6

Texture—silt loam

#### *C horizon:*

Color (above a depth of 50 inches)—hue of 5YR to 2.5Y, value of 3 to 5, and chroma of 3 to 6

Color (below a depth of 50 inches)—horizon has hue of 5YR to 5Y, value of 3 to 5, and chroma of 1 to 6 or is neutral in hue and has value of 3 to 5

Redoximorphic features (above a depth of 20 inches)—iron depletions or accumulations in shades of yellow, brown, or red

Redoximorphic features (between depths of 20 and 50 inches)—iron depletions in shades of gray or yellow and iron accumulations in shades of yellow, brown, or red

Redoximorphic features (below a depth of 50 inches)—iron depletions in shades of gray or brown and iron accumulations in shades of yellow, brown, or red

Texture (above a depth of 40 inches)—silt loam, silty clay loam, sandy loam, fine sandy loam, or loam having strata of sandy or clayey material

Texture (below a depth of 40 inches)—variable; ranging from loamy sand to silty clay

### Creedmoor Series

*Depth class:* Very deep

*Drainage class:* Moderately well drained or somewhat poorly drained (fig. 19)

*Permeability:* Very slow

*Parent material:* Residuum weathered from interbedded sedimentary rocks

*Landscape:* Piedmont uplands

*Landform:* Broad ridges and hill slopes

*Slope:* 2 to 10 percent

*Taxonomic class:* Clayey, mixed, thermic Aquic Hapludults

#### Typical Pedon

Creedmoor coarse sandy loam, 2 to 6 percent slopes; 3.0 miles southwest of Creedmoor on U.S. Highway 15, about 0.8 mile northwest of the intersection of Secondary Road 1103 and U.S. Highway 15 on Secondary Road 1103, about 0.8 mile northeast of the intersection of Secondary Roads 1103 and 1104 on Secondary Road 1104, about 20 feet west of Secondary Road 1104, in a cultivated field; Creedmoor USGS topographic quadrangle; lat. 36 degrees 06 minutes 48 seconds N. and long. 78 degrees 43 minutes 00 seconds W.

Ap—0 to 7 inches; brown (10YR 5/3) coarse sandy loam; weak fine and medium granular structure; very friable; nonsticky, nonplastic; 5 percent gravel by volume; moderately acid; clear smooth boundary.

Bt1—7 to 18 inches; 60 percent brownish yellow (10YR 6/6), 30 percent red (2.5YR 5/6), and 10 percent light gray (10YR 7/2) clay; strong medium subangular blocky structure; very firm; moderately sticky, moderately plastic; iron depletions occurring as areas in shades of gray and iron accumulations occurring as areas in shades of yellow and red; extremely acid; gradual wavy boundary.

Bt2—18 to 36 inches; 50 percent yellowish brown (10YR 5/8), 30 percent light gray (10YR 7/1), 10 percent red (2.5YR 5/6), and 10 percent reddish yellow (7.5YR 7/8) clay; strong medium subangular blocky structure; very firm; moderately sticky, moderately plastic; iron depletions occurring as areas in shades of gray and iron accumulations occurring as areas in shades of brown, red, and yellow; extremely acid; gradual wavy boundary.

Bt3—36 to 52 inches; 40 percent reddish yellow (7.5YR 7/8), 25 percent light gray (10YR 7/1), 20 percent yellowish red (5YR 5/8), and 15 percent brown (10YR 5/3) clay; moderate fine and medium subangular blocky structure; firm; moderately sticky, moderately plastic; iron depletions occurring as

areas in shades of gray and iron accumulations occurring as areas in shades of yellow, red, and brown; extremely acid; gradual wavy boundary.

**BCg**—52 to 68 inches; 55 percent dark gray (N 4/0), 25 percent reddish yellow (7.5YR 6/8), and 20 percent red (10R 4/6) silty clay; weak coarse subangular blocky structure; firm; slightly sticky, slightly plastic; iron depletions occurring as areas in shades of gray and iron accumulations occurring as areas in shades of yellow and red; very strongly acid; gradual wavy boundary.

**Cg**—68 to 83 inches; 60 percent dark gray (N 4/0), 25 percent light gray (10YR 7/1), and 15 percent reddish yellow (7.5YR 6/8) silt loam saprolite; massive; friable; nonsticky, nonplastic; iron depletions occurring as areas in shades of gray and iron accumulations occurring as areas in shades of yellow; extremely acid.

#### Range in Characteristics

*Thickness of the solum:* 25 to 60 inches

*Depth to bedrock:* More than 60 inches

*Content of mica flakes:* None

*Content and size of rock fragments:* Less than 5 percent by volume in the A horizon; mostly gravel

*Reaction:* Extremely acid to strongly acid throughout the profile, except where the surface layer has been limed

#### *A or Ap horizon:*

Color—hue of 7.5 to 2.5Y, value of 3 to 6, and chroma of 1 to 6

Texture—coarse sandy loam

#### *BE horizon (if it occurs):*

Color—hue of 10YR to 2.5Y, value of 5 to 7, and chroma of 4 to 6

Texture—sandy loam, sandy clay loam, loam, silty clay loam, or silt loam

#### *Bt horizon:*

Color—hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 to 8

Texture—sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, or clay

Redoximorphic features—iron or clay depletions in shades of gray or brown and iron accumulations in shades of yellow, brown, or red

#### *BCg horizon:*

Color—horizon is neutral in hue or has hue of 2.5YR to 2.5Y, value of 4 to 8, and chroma of 0 to 2

Texture—sandy clay loam, clay loam, silty clay loam, or silty clay

Redoximorphic features—iron or clay depletions in shades of white, gray, or brown and iron

accumulations in shades of yellow, brown, or red

#### *Cg horizon:*

Color—horizon is neutral in hue or has hue of 10R to 2.5Y, value of 3 to 8, and chroma of 0 to 2

Texture—loamy sand, sandy loam, fine sandy loam, loam, sandy clay loam, clay loam, silt loam, silty clay loam, or sandy clay saprolite

Redoximorphic features—iron or clay depletions in shades of white, gray, or brown and iron accumulations in shades of yellow, brown, or red

### Enon Series

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Slow

*Parent material:* Residuum weathered from mafic intrusive rocks

*Landscape:* Piedmont uplands

*Landform:* Convex knolls, ridges, and hill slopes

*Slope:* 2 to 10 percent

*Taxonomic class:* Fine, mixed, thermic Ultic Hapludalfs

#### Typical Pedon

Enon loam, 6 to 10 percent slopes; 1,600 feet southeast of the intersection of Secondary Roads 1004 and 1120 on Secondary Road 1004 in Butner, 0.25 mile west of Umstead Hospital, in an area of woodland; Lake Mitchie USGS topographic quadrangle; lat. 36 degrees 08 minutes 28 seconds N. and long. 78 degrees 47 minutes 22 seconds W.

**A**—0 to 5 inches; dark brown (7.5YR 3/2) loam; weak medium granular structure; friable; strongly acid; abrupt smooth boundary.

**Bt1**—5 to 17 inches; dark yellowish brown (10YR 4/4) clay; moderate medium subangular blocky structure; very firm; very sticky, very plastic; common distinct clay films on faces of peds; moderately acid; gradual wavy boundary.

**Bt2**—17 to 21 inches; yellowish brown (10YR 5/4) clay; moderate medium subangular blocky structure; firm; very sticky, very plastic; few faint clay films on faces of peds; slightly acid; gradual wavy boundary.

**BC**—21 to 25 inches; yellowish brown (10YR 5/6) clay loam; common fine distinct dark yellowish brown (10YR 4/4) and dark brown (10YR 3/3) mottles; weak medium subangular blocky structure; firm; very sticky, very plastic; neutral; gradual wavy boundary.

**C**—25 to 65 inches; multicolored sandy clay loam

saprolite in shades of brown and yellow; massive; friable; nonsticky, nonplastic; slightly alkaline.

#### Range in Characteristics

*Thickness of the solum:* 20 to 44 inches

*Depth to bedrock:* More than 60 inches

*Content of mica flakes:* None

*Content and size of rock fragments:* Less than 15 percent by volume; mostly gravel

*Reaction:* Strongly acid to slightly acid in the A horizon and the upper part of the B horizon, except where the surface layer has been limed, and strongly acid to slightly alkaline in the lower part of the B horizon and in the C horizon

#### *Ap or A horizon:*

Color—hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 to 4

Texture—loam

#### *Bt horizon:*

Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8

Mottles—shades of red, brown, yellow, olive, or gray in the lower part

Texture—clay loam or clay

#### *BC horizon:*

Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8

Mottles—shades of red, brown, yellow, olive, or gray

Texture—loam, sandy clay loam, or clay loam

#### *C horizon:*

Color—multicolored in shades of red, yellow, or brown

Texture—variable; commonly loam or sandy clay loam saprolite

### Georgeville Series

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Parent material:* Residuum weathered from mixed felsic and mafic volcanic rocks (fig. 20)

*Landscape:* Piedmont uplands

*Landform:* Ridges and hill slopes

*Slope:* 2 to 10 percent

*Taxonomic class:* Clayey, kaolinitic, thermic Typic Hapludults

#### Typical Pedon

Georgeville silt loam, 2 to 6 percent slopes; 5 miles north of Oxford on U.S. Highway 15, about 50 feet

northeast on Secondary Road 1427, in a pasture; Stovall USGS topographic quadrangle; lat. 36 degrees 27 minutes 26 seconds N. and long. 78 degrees 36 minutes 24 seconds W.

Ap—0 to 8 inches; strong brown (7.5YR 5/6) silt loam; weak medium granular structure; very friable; strongly acid; abrupt smooth boundary.

Bt1—8 to 24 inches; red (2.5YR 4/8) clay; moderate medium subangular blocky structure; firm; slightly sticky, slightly plastic; few faint clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt2—24 to 37 inches; red (2.5YR 4/6) clay; few fine distinct reddish yellow (7.5YR 6/8) mottles; moderate medium subangular blocky structure; firm; slightly sticky, slightly plastic; few faint clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt3—37 to 50 inches; red (2.5YR 5/8) clay loam; few fine distinct reddish yellow (7.5YR 5/8) mottles; moderate fine subangular blocky structure; friable; slightly sticky, slightly plastic; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

BC—50 to 62 inches; red (2.5YR 4/8) clay loam; common fine distinct reddish yellow (7.5YR 6/8) mottles; weak medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

C—62 to 72 inches; red (2.5YR 4/8) silt loam saprolite; common fine distinct reddish yellow (7.5YR 6/8) mottles; massive; very friable; very strongly acid.

#### Range in Characteristics

*Thickness of the solum:* 40 to more than 60 inches

*Depth to bedrock:* More than 60 inches

*Content of mica flakes:* None or few in the lower part of the B horizon

*Content and size of rock fragments:* Less than 15 percent by volume in the A horizon and less than 10 percent in the B and C horizons; mostly gravel

*Reaction:* Very strongly acid to moderately acid in the A horizon, except where the surface layer has been limed, and very strongly acid or strongly acid in the B and C horizons

#### *A or Ap horizon:*

Color—horizon is neutral in hue or has hue of 5YR to 2.5Y, value of 4 or 5, and chroma of 0 to 8

Texture (fine-earth fraction)—silt loam

#### *Bt horizon:*

Color—hue of 10R or 2.5YR, value of 4 or 5, and chroma of 6 to 8

Mottles—shades of brown or yellow

Texture—clay loam, silty clay loam, or clay

**BC horizon:**

Color—hue of 10R to 5YR, value of 4 or 5, and chroma of 6 to 8

Mottles—shades of brown or yellow

Texture—loam, clay loam, silt loam, or silty clay loam

**C horizon:**

Color—hue of 10R to 10YR, value of 4 to 6, and chroma of 3 to 8

Mottles—shades of red, brown, yellow, or red

Texture—sandy loam, fine sandy loam, very fine sandy loam, loam, or silt loam saprolite

**Helena Series**

*Depth class:* Very deep

*Drainage class:* Moderately well drained

*Permeability:* Slow

*Parent material:* Residuum weathered from felsic intrusive rocks

*Landscape:* Piedmont uplands

*Landform:* Interstream divides, head of drainageways, depressions, and the lower hill slopes

*Slope:* 2 to 10 percent

*Taxonomic class:* Clayey, mixed, thermic Aquic Hapludults

**Typical Pedon**

Helena sandy loam, 2 to 6 percent slopes; 1.4 miles south of Huntsboro on Secondary Road 1521, about 150 feet west on Secondary Road 1521, in a pasture; Oxford USGS topographic quadrangle; lat. 36 degrees 20 minutes 44 seconds N. and long. 78 degrees 20 minutes 44 seconds W.

Ap—0 to 9 inches; grayish brown (10YR 5/2) sandy loam; weak medium granular structure; friable; many fine and common medium roots; slightly acid; abrupt smooth boundary.

E—9 to 12 inches; light yellowish brown (10YR 6/4) sandy loam; weak medium granular structure; friable; common fine and few medium roots; very strongly acid; gradual wavy boundary.

BE—12 to 19 inches; brownish yellow (10YR 6/6) sandy clay loam; common medium distinct strong brown (7.5YR 5/8) mottles; weak medium granular structure; friable; few fine roots; few fine pores; very strongly acid; gradual wavy boundary.

Bt1—19 to 24 inches; yellowish brown (10YR 5/8) clay; few fine distinct pale brown (10YR 6/3) irregularly shaped masses of iron accumulation with clear boundaries throughout and gray (10YR 6/1) irregularly shaped iron depletions with clear boundaries throughout; moderate medium

subangular blocky structure; firm; slightly sticky, slightly plastic; few fine roots; few fine pores; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt2—24 to 40 inches; strong brown (7.5YR 5/8) clay; common medium distinct gray (10YR 6/1) irregularly shaped iron depletions with clear boundaries throughout; moderate medium subangular blocky structure; firm; moderately sticky, moderately plastic; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

BCg—40 to 50 inches; light gray (10YR 7/1) clay loam; many coarse prominent brownish yellow (10YR 6/6) and strong brown (7.5YR 5/8) irregularly shaped masses of iron accumulation with clear boundaries throughout; weak medium subangular blocky structure; friable; slightly sticky, slightly plastic; very strongly acid; gradual wavy boundary.

C1—50 to 60 inches; strong brown (7.5YR 5/8) sandy loam saprolite; common medium distinct light gray (10YR 7/1) irregularly shaped iron depletions with clear boundaries throughout; massive; very friable; very strongly acid; gradual wavy boundary.

C2—60 to 72 inches; strong brown (7.5YR 5/8) sandy loam saprolite; many medium prominent light gray (10YR 7/1) irregularly shaped iron depletions with clear boundaries throughout and yellow (10YR 7/8) irregularly shaped masses of iron accumulation with clear boundaries throughout; massive; very friable; strongly acid.

**Range in Characteristics**

*Thickness of the solum:* 40 to 60 inches

*Depth to bedrock:* More than 60 inches

*Content of mica flakes:* None

*Content and size of rock fragments:* Less than 15 percent by volume; mostly gravel

*Reaction:* Extremely acid to strongly acid throughout the profile, except where the surface layer has been limed

**Ap horizon:**

Color—hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 1 to 4

Texture—sandy loam

**E horizon:**

Color—hue of 10YR to 5Y, value of 5 to 8, and chroma of 2 to 4

Texture—loamy coarse sand, loamy sand, coarse sandy loam, sandy loam, fine sandy loam, or loam

**BE horizon:**

Color—hue of 7.5YR to 5Y, value of 5 to 8, and chroma of 3 to 8

Texture—sandy clay loam or clay loam

**Bt horizon:**

Color—hue of 7.5YR to 5Y, value of 5 to 8, and chroma of 3 to 8  
 Texture—clay loam, sandy clay, or clay  
 Redoximorphic features—iron or clay depletions in shades of white, gray, or brown and iron accumulations in shades of yellow, brown, or red

**BCg horizon:**

Color—hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2  
 Texture—sandy loam, fine sandy loam, loam, sandy clay loam, or clay loam  
 Redoximorphic features—iron or clay depletions in shades of white, gray, or brown and iron accumulations in shades of yellow, brown, or red

**C horizon:**

Color—hue of 5YR to 5Y, value of 5 to 8, and chroma of 3 to 8  
 Texture—variable; commonly sandy clay loam, loam, fine sandy loam, or sandy loam saprolite  
 Redoximorphic features—iron or clay depletions in shades of white, gray, or brown and iron accumulations in shades of yellow or brown

**Herndon Series**

**Depth class:** Very deep

**Drainage class:** Well drained

**Permeability:** Moderate

**Parent material:** Residuum weathered from mixed felsic and mafic volcanic rocks

**Landscape:** Piedmont uplands

**Landform:** Ridges and hill slopes

**Slope:** 2 to 10 percent

**Taxonomic class:** Clayey, kaolinitic, thermic Typic Hapludults

**Typical Pedon**

Herndon silt loam, 2 to 6 percent slopes; 3 miles northwest of Oxford on U.S. Highway 96, about 200 feet northeast of the intersection of Secondary Roads 1300 and 1452, in a field; Berea USGS topographic quadrangle; lat. 36 degrees 23 minutes 03 seconds N. and long. 78 degrees 37 minutes 58 seconds W.

Ap—0 to 8 inches; brownish yellow (10YR 6/4) silt loam; weak medium granular structure; very friable; strongly acid; clear smooth boundary.

Bt1—8 to 22 inches; brownish yellow (10YR 6/8) clay loam; few fine prominent red (2.5YR 4/8) mottles; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; very

strongly acid; gradual wavy boundary.

Bt2—22 to 34 inches; brownish yellow (10YR 6/7) clay loam; common fine prominent red (2.5YR 4/8) and few fine distinct very pale brown (10YR 8/4) mottles; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

BC—34 to 40 inches; brownish yellow (10YR 6/8) silty clay loam; common fine prominent red (2.5YR 4/8) and common medium distinct very pale brown (10YR 8/4) mottles; weak medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

C1—40 to 53 inches; mottled brownish yellow (10YR 6/8), red (2.5YR 4/8), and very pale brown (10YR 8/4) silt loam saprolite; massive; very friable; very strongly acid; gradual wavy boundary.

C2—53 to 65 inches; multicolored silt loam saprolite in shades of red, yellow, and white; massive; very friable; very strongly acid.

**Range in Characteristics**

**Thickness of the solum:** 40 to 60 inches

**Depth to bedrock:** More than 60 inches

**Content of mica flakes:** None

**Content and size of rock fragments:** Less than 50 percent by volume in the A horizon and less than 10 percent in the B and C horizons; mostly gravel

**Reaction:** Very strongly acid to slightly acid in the A horizon, except where limed, and extremely acid to strongly acid in the B and C horizons

**Ap or A horizon:**

Color—hue of 7.5YR to 5Y, value of 3 to 6, and chroma of 2 to 8

Texture—silt loam

**Bt horizon:**

Color—hue of 5YR to 10YR, value of 4 to 7, and chroma of 4 to 8

Mottles—shades of red, brown, or yellow

Texture (upper part)—clay loam, silty clay, or clay

Texture (lower part)—clay loam, silty clay, clay, or silty clay loam

**BC horizon (if it occurs):**

Color—hue of 5YR to 10YR, value of 4 to 7, and chroma of 4 to 8

Mottles—shades of red, brown, or yellow

Texture—loam, silt loam, silty clay loam, or clay loam

**C horizon:**

Color—mottled or multicolored in shades of red, brown, yellow, or white

Texture—fine sandy loam, loam, or silt loam saprolite



**Iredell Series**

*Depth class:* Deep

*Drainage class:* Moderately well drained

*Permeability:* Slow

*Parent material:* Residuum weathered from mafic intrusive rocks

*Landscape:* Piedmont uplands

*Landform:* Ridges, broad interstream divides, head of drainageways, and hill slopes

*Slope:* 2 to 10 percent

*Taxonomic class:* Fine, montmorillonitic, thermic Typic Hapludalfs

**Typical Pedon**

Iredell loam, 2 to 6 percent slopes; 0.5 mile north of the intersection of Secondary Roads 1103 and 1120, about 800 feet east of Secondary Road 1103, in an area of woodland; Lake Mitchie USGS topographic quadrangle; lat. 36 degrees 08 minutes 42 seconds N. and long. 78 degrees 46 minutes 25 seconds W.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) loam; weak medium granular structure; friable; slightly sticky, slightly plastic; many fine and medium roots; few fine and medium black concretions; slightly acid; abrupt smooth boundary.

BA—6 to 10 inches; brown (10YR 4/3) loam; weak medium granular structure; friable; slightly sticky, slightly plastic; many fine roots; few fine and medium black concretions; slightly acid; abrupt smooth boundary.

Bt—10 to 24 inches; dark brown (10YR 4/3) clay; moderate medium subangular blocky structure; very firm; very sticky, very plastic; few distinct clay films on faces of peds; common fine black concretions; slightly acid; gradual wavy boundary.

BC—24 to 28 inches; dark brown (10YR 4/3) clay loam; common medium distinct light brownish gray (10YR 6/2) irregularly shaped iron depletions with clear boundaries in the matrix and common fine prominent strong brown (7.5YR 5/6) irregularly shaped masses of iron accumulation with clear boundaries throughout; weak medium subangular blocky structure; very firm; moderately sticky, moderately plastic; few fine black concretions; neutral; gradual smooth boundary.

C—28 to 53 inches; 50 percent brownish yellow (10YR 6/6), 35 percent light brownish gray (10YR 6/2), and 15 percent black (10YR 2/1) loam saprolite; iron depletions occurring as areas in shades of gray and iron accumulations occurring as areas in shades of yellow or black; neutral; gradual irregular boundary.

Cr—53 to 65 inches; weathered, multicolored, fractured diabase that can be dug by a spade with difficulty.

**Range in Characteristics**

*Thickness of the solum:* 20 to 40 inches

*Depth to bedrock:* 40 to 60 inches to soft bedrock and more than 60 inches to hard bedrock

*Content of mica flakes:* None to many in the B and C horizons

*Content and size of rock fragments:* Less than 15 percent by volume in the A and B horizons and less than 10 percent in the C horizon; mostly gravel

*Reaction:* Strongly acid to neutral in the A horizon, moderately acid to slightly alkaline in the B horizon, and neutral or slightly alkaline in the C horizon

*Ap horizon:*

Color—hue of 10YR to 5Y, value of 4 or 5, and chroma of 2 to 4

Texture—loam

*BA horizon:*

Color—hue of 10YR to 5Y, value of 4 to 6, and chroma of 2 to 4

Texture—loam, clay loam, or silt loam

*Bt horizon:*

Color—hue of 10YR to 5Y, value of 4 to 6, and chroma of 3 to 6

Texture—clay loam or clay

*BC horizon:*

Color—hue of 10YR to 5Y, value of 4 to 7, and chroma of 3 to 6

Mottles—shades of red, brown, yellow, olive, or gray

Texture—sandy clay loam, clay loam, or clay

Redoximorphic features—iron or clay depletions in shades of white, olive gray, or brown and iron accumulations in shades of yellow, brown, red, or black

*C horizon:*

Color—mottled or multicolored in shades of brown, yellow, black, white, olive, or gray

Texture—sandy loam, loam, or sandy clay loam saprolite

Redoximorphic features—iron or clay depletions in shades of white, olive gray, or brown and iron accumulations in shades of yellow, brown, or red

*Cr layer:*

Type of bedrock—weathered, multicolored mafic intrusive rocks that can be dug by hand tools with difficulty

**Lignum Series**

*Depth class:* Deep

*Drainage class:* Moderately well drained and somewhat poorly drained

*Permeability:* Very slow

*Parent material:* Residuum weathered from felsic volcanic rocks

*Landscape:* Piedmont uplands

*Landform:* Broad interstream divides, slight depressions, and head of drainageways

*Slope:* 2 to 6 percent

*Taxonomic class:* Clayey, mixed, thermic Aquic Hapludults

### Typical Pedon

Lignum silt loam, 2 to 6 percent slopes; 3.0 miles northwest of Oxford on U.S. Highway 98, about 1.2 miles north of Kinton on Secondary Road 1300, about 100 feet west of Secondary Road 1300, in a field; Berea USGS topographic quadrangle; lat. 36 degrees 21 minutes 44 seconds N. and long. 78 degrees 37 minutes 52 seconds W.

Ap—0 to 10 inches; light yellowish brown (10YR 6/4) silt loam; weak medium granular structure; friable; slightly sticky, slightly plastic; strongly acid; abrupt smooth boundary.

BE—10 to 14 inches; light yellowish brown (10YR 6/4) silt loam; weak medium granular structure; friable; slightly sticky, slightly plastic; strongly acid; gradual wavy boundary.

Bt1—14 to 20 inches; light yellowish brown (10YR 6/4) silty clay loam; common fine distinct strong brown (7.5YR 5/8) irregularly shaped masses of iron accumulation with clear boundaries throughout and gray (10YR 7/2) irregularly shaped iron depletions with sharp boundaries in the matrix; moderate fine subangular blocky structure; friable; moderately sticky, moderately plastic; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt2—20 to 34 inches; brownish yellow (10YR 6/6) silty clay loam; common medium distinct yellowish brown (10YR 5/8) irregularly shaped masses of iron accumulation with clear boundaries throughout and gray (10YR 7/2) irregularly shaped iron depletions with sharp boundaries in the matrix; moderate medium subangular blocky structure; firm; moderately sticky, moderately plastic; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

BC—34 to 39 inches; brownish yellow (10YR 6/6) silt loam; common medium distinct light gray (10YR 7/2) irregularly shaped iron depletions with clear boundaries throughout and strong brown (7.5YR 5/8) irregularly shaped masses of iron accumulation with clear boundaries throughout; weak fine subangular blocky structure; friable; strongly acid; gradual wavy boundary.

C—39 to 46 inches; multicolored silt loam saprolite in shades of brown, yellow, or gray; massive; firm; 10 percent gravel by volume; iron depletions occurring as areas in shades of gray and iron accumulations occurring as areas in shades of brown and yellow; strongly acid; abrupt smooth boundary.

Cr—46 to 62 inches; weathered, multicolored, fractured schist that can be dug by a spade with difficulty.

### Range in Characteristics

*Thickness of the solum:* 20 to 40 inches

*Depth to bedrock:* 40 to 60 inches to soft bedrock and more than 60 inches to hard bedrock

*Content of mica flakes:* None

*Content and size of rock fragments:* Less than 15 percent by volume in the A and B horizons and 10 to 50 percent in the C horizon; mostly gravel

*Reaction:* Very strongly acid or strongly acid throughout the profile, except where the surface layer has been limed

*A or Ap horizon:*

Color—hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 1 to 4

Texture—silt loam

*BE horizon:*

Color—7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 to 8

Texture—loam, silt loam, clay loam, or silty clay loam

*Bt horizon:*

Color—hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 1 to 8

Texture—clay loam, silty clay loam, silty clay, or clay

Redoximorphic features—iron or clay depletions in shades of white, gray, or brown and iron accumulations in shades of yellow or brown

*BC horizon:*

Color—hue of 7.5YR to 5Y, value of 5 to 7, and chroma of 1 to 8

Texture (fine-earth fraction)—loam, silt loam, clay loam, or silty clay loam

Redoximorphic features—iron or clay depletions in shades of white, gray, or brown and iron accumulations in shades of yellow or brown

*C horizon:*

Color—variable; commonly multicolored in shades of brown, yellow, or gray

Texture (fine-earth fraction)—silt, silt loam, sandy clay loam, or silty clay loam

Redoximorphic features—iron or clay depletions in shades of white, gray, or brown and iron accumulations in shades of yellow or brown

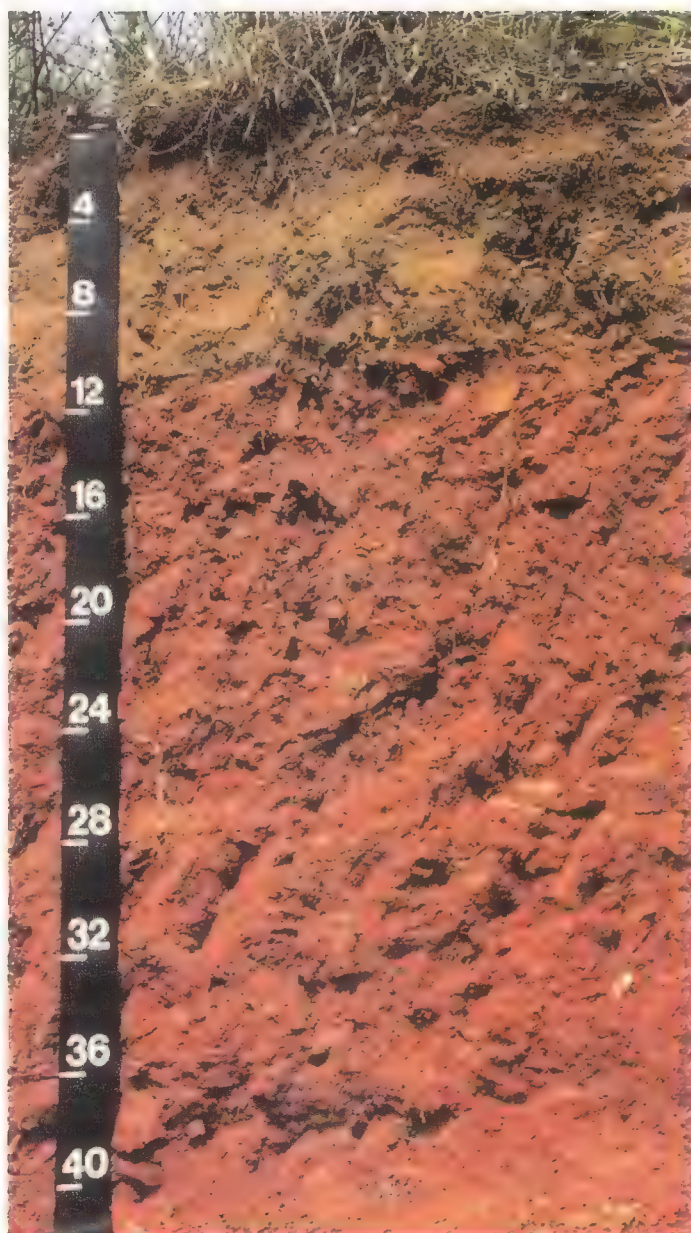


Figure 18.—Cecil soils formed from felsic intrusive rocks, are very deep and clayey, and have a red subsoil.



Figure 19.—Creedmoor soils are moderately well drained or somewhat poorly drained, have a highly mottled subsoil, and have a seasonal high water table at a depth of 1.5 to 2.0 feet.



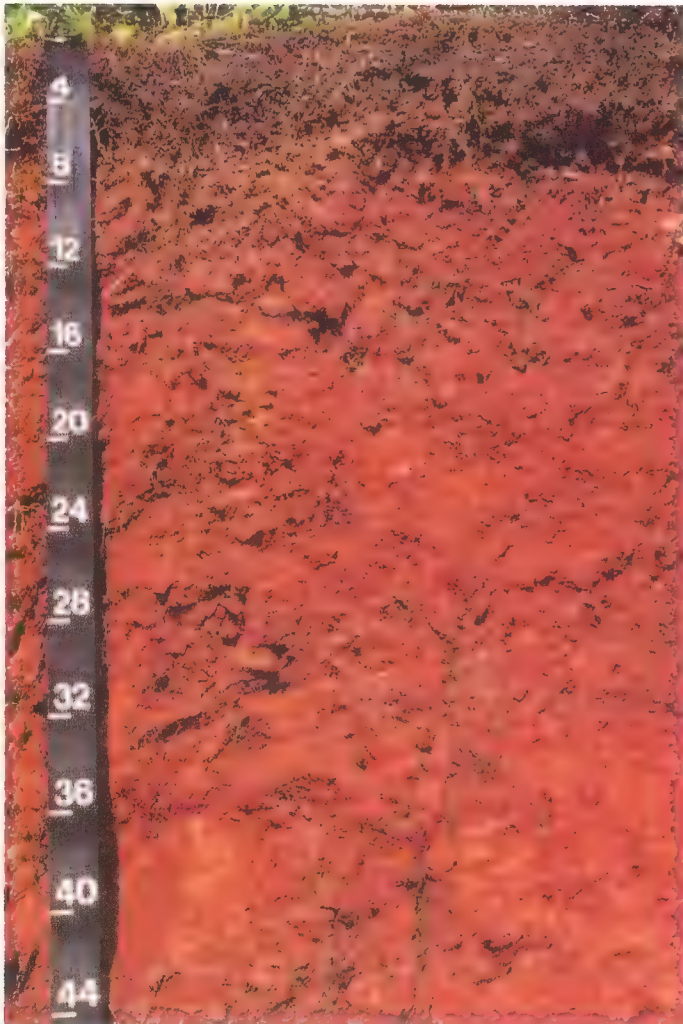


Figure 20.—Georgeville soils formed from mixed mafic and felsic volcanic rocks. Soils formed from these materials are high in silt and are very erosive.



Figure 21.—Nason soils have fractured bedrock at a depth of 40 to 60 inches. The rock can be dug by hand tools. Its hardness generally increases as depth increases.



Figure 22.—Picture soils are deep, poorly drained, clayey soils that have a high shrink-swell potential.



Figure 23.—Tatum soils formed from mixed mafic and felsic volcanic rocks. These well drained, clayey soils have bedrock that can be dug by hand tools at a depth of 40 to 60 inches.



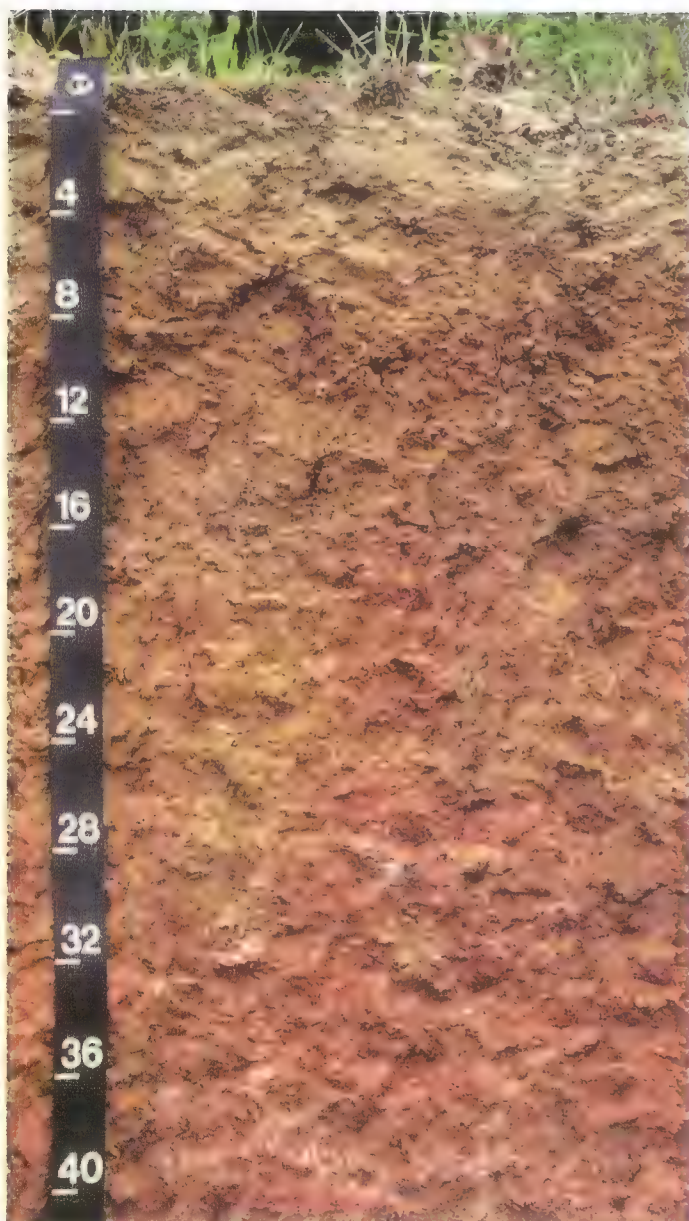


Figure 24.—Vance soils are very deep, well drained, clayey soils. They have a moderate potential for shrinking and swelling.

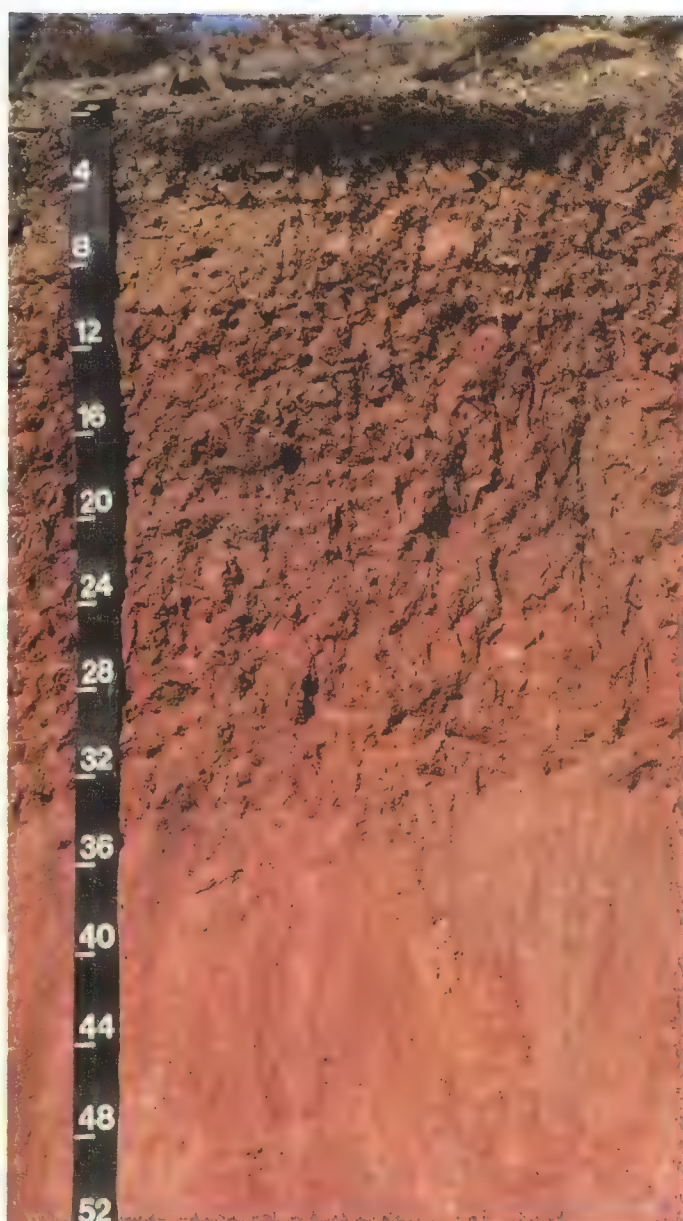


Figure 25.—Wedowee soils formed from felsic intrusive rocks. They are very deep, clayey soils that have a brown subsoil.



*Cr layer:*

Type of bedrock—weathered, multicolored, fractured felsic volcanic rocks that can be dug by hand tools with difficulty

*R layer (if it occurs):*

Type of bedrock—unweathered, fractured felsic volcanic rocks

**Mayodan Series**

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Parent material:* Residuum weathered from interbedded sedimentary rocks

*Landscape:* Piedmont uplands

*Landform:* Ridges and convex knolls

*Slope:* 2 to 6 percent

*Taxonomic class:* Clayey, mixed, thermic Typic Hapludults

**Typical Pedon**

Mayodan sandy loam, 2 to 6 percent slopes; 2.3 miles south of Stem on Secondary Road 1127, about 0.2 mile east on Secondary Road 1129, about 0.2 mile northeast on a farm road, 80 feet south of the farm road, in a field; Stem USGS topographic quadrangle; lat. 36 degrees 10 minutes 20 seconds N. and long. 78 degrees 42 minutes 06 seconds W.

Ap—0 to 9 inches; yellowish brown (10YR 5/4) sandy loam; weak medium and coarse granular structure; very friable; many very fine to coarse roots; slightly acid; abrupt smooth boundary.

Bt1—9 to 15 inches; brownish yellow (10YR 6/8) clay loam; few fine prominent yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable; moderately sticky, nonplastic; few fine to coarse roots; few faint clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt2—15 to 28 inches; strong brown (7.5YR 5/8) clay loam; common fine distinct brownish yellow (10YR 6/8) and common fine prominent yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; firm; slightly sticky, slightly plastic; few fine and medium roots; common faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt3—28 to 35 inches; strong brown (7.5YR 5/8) clay; common medium distinct brownish yellow (10YR 6/8) and common medium prominent yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; firm; slightly sticky, slightly plastic; few fine and medium roots; common faint clay films

on faces of peds; very strongly acid; gradual wavy boundary.

BC—35 to 44 inches; yellowish brown (10YR 5/6) clay loam; common medium distinct strong brown (7.5YR 6/8) and yellowish red (5YR 5/8) and common medium prominent light gray (10YR 7/1) mottles; weak medium subangular blocky structure; friable; moderately sticky, slightly plastic; few fine and medium roots; very strongly acid; gradual wavy boundary.

C—44 to 65 inches; multicolored sandy clay loam saprolite in shades of red, brown, and white; massive; very friable; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Cr—65 to 75 inches; weathered, multicolored sandstone that can be dug by a spade with difficulty.

**Range in Characteristics**

*Thickness of the solum:* 30 to 60 inches

*Depth to bedrock:* More than 60 inches

*Content of mica flakes:* None to common in the B horizon

*Content and size of rock fragments:* Less than 15 percent by volume in the A and E horizons and less than 5 percent in the B horizon; mostly gravel

*Reaction:* Very strongly acid to moderately acid in the A horizon and the upper part of the B horizon, except where the surface layer has been limed, and very strongly acid or strongly acid in the lower part of the B horizon and in the C horizon

*Ap horizon:*

Color—hue of 5YR to 2.5Y, value of 2 to 6, and chroma of 2 to 8

Texture—sandy loam

*E horizon (if it occurs):*

Color—hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 to 6

Texture—loamy sand, sandy loam, fine sandy loam, loam, or silt loam

*Bt horizon:*

Color—hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 3 to 8

Mottles—shades of red, brown, or yellow

Texture—sandy clay, clay loam, silty clay loam, silty clay, or clay

*BC horizon:*

Color—horizon has hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 2 to 8 or is mottled in shades of these colors

Mottles—shades of red, brown, yellow, or gray

Texture—sandy clay loam, sandy clay, clay loam, silty clay loam, silty clay, or loam

*C horizon:*

Color—horizon is multicolored in shades of red, brown, yellow, or white or has hue of 2.5YR to 7.5YR, value of 3 to 6, and chroma of 2 to 8

Texture—variable; commonly sandy loam, loam, sandy clay loam, clay loam, silty clay loam, or clay saprolite

*Cr layer:*

Type of bedrock—weathered, multicolored, interbedded sedimentary rocks that can be dug by hand tools with difficulty

**Nason Series**

*Depth class:* Deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Parent material:* Residuum weathered from felsic volcanic rocks

*Landscape:* Piedmont uplands

*Landform:* Narrow ridgetops and hill slopes

*Slope:* 2 to 50 percent

*Taxonomic class:* Clayey, mixed, thermic Typic Hapludults

**Typical Pedon**

Nason gravelly loam, 2 to 6 percent slopes; 0.7 mile west of Culbreth on Secondary Road 1139, about 1.5 miles west on Secondary Road 1126, about 2.0 miles west on a farm road, 75 feet west of the farm road on Bowling's Mountain, in an area of woodland; Roxboro USGS topographic quadrangle; lat. 36 degrees 16 minutes 24 seconds N. and long. 78 degrees 46 minutes 01 seconds W.

A—0 to 7 inches; grayish brown (10YR 4/2) gravelly loam; moderate fine granular structure; nonsticky, nonplastic; common fine, many medium, and few coarse roots; 20 percent gravel by volume; very strongly acid; clear smooth boundary.

E—7 to 12 inches; yellowish brown (10YR 5/4) loam; weak fine subangular blocky structure; friable; slightly sticky, nonplastic; common fine and medium roots; 10 percent gravel by volume; very strongly acid; clear wavy boundary.

Bt1—12 to 24 inches; strong brown (7.5YR 5/6) clay loam; moderate fine subangular blocky structure; firm; moderately sticky, moderately plastic; few medium roots; 5 percent gravel by volume; very strongly acid; gradual wavy boundary.

Bt2—24 to 32 inches; yellowish red (5YR 5/6) clay; moderate fine subangular blocky structure; firm; moderately sticky, moderately plastic; few medium

roots; 5 percent gravel by volume; very strongly acid; gradual wavy boundary.

BC—32 to 37 inches; strong brown (10YR 5/8) gravelly silty clay loam; weak medium subangular blocky structure; friable; slightly sticky, nonplastic; few fine roots; 15 percent gravel by volume; very strongly acid; gradual wavy boundary.

C—37 to 42 inches; multicolored gravelly silt loam saprolite in shades of red, brown, and white; massive; very friable; 15 percent gravel by volume; very strongly acid; gradual irregular boundary.

Cr—42 to 50 inches; weathered, multicolored, fractured schist that can be dug by a spade with difficulty.

**Range in Characteristics**

*Thickness of the solum:* 20 to 50 inches

*Depth to bedrock:* 40 to 60 inches to soft bedrock and more than 60 inches to hard bedrock (fig. 21)

*Content of mica flakes:* None

*Content and size of rock fragments:* 15 to 35 percent by volume in the A, E, and Bt horizons and 15 to 40 percent in the BC and C horizons; mostly gravel

*Reaction:* Very strongly acid or strongly acid throughout the profile, except where the surface layer has been limed

*A horizon:*

Color—hue of 7.5YR or 10YR, value of 2 to 5, and chroma of 2 to 4

Texture (fine-earth fraction)—loam

*E horizon:*

Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 2 to 6

Texture (fine-earth fraction)—fine sandy loam, loam, or silt loam

*Bt horizon:*

Color—hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8

Texture (fine-earth fraction)—clay loam, silty clay loam, silty clay, or clay

*BC horizon:*

Color—hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 4 to 8

Texture (fine-earth fraction)—loam, silt loam, clay loam, or silty clay loam

*C horizon:*

Color—multicolored in shades of red, brown, yellow, or white

Texture—silt loam or silty clay loam saprolite

*Cr layer:*

Type of bedrock—weathered, fractured felsic volcanic rocks that can be dug by hand tools with difficulty

**Pacolet Series***Depth class:* Very deep*Drainage class:* Well drained*Permeability:* Moderate*Parent material:* Residuum weathered from felsic intrusive rocks*Landscape:* Piedmont uplands*Landform:* Narrow hill slopes*Slope:* 10 to 50 percent*Taxonomic class:* Clayey, kaolinitic, thermic Typic Kanhapludults**Typical Pedon**

Pacolet sandy loam, 10 to 25 percent slopes; 1,200 feet east of a barn on the road on Oxford Masonic Orphanage Farm, in a pasture near a fence; Oxford USGS topographic quadrangle; lat. 36 degrees 19 minutes 20 seconds N. and long. 78 degrees 35 minutes 20 seconds W.

Ap—0 to 8 inches; reddish brown (5YR 4/4) sandy loam; moderate medium subangular blocky structure; friable; very strongly acid; clear smooth boundary.

Bt—8 to 25 inches; red (2.5YR 4/6) clay; weak medium subangular blocky structure; firm; moderately sticky, moderately plastic; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

BC—25 to 40 inches; red (2.5YR 4/8) clay loam; weak medium subangular blocky structure; firm; slightly sticky, slightly plastic; common fine flakes of mica; very strongly acid; gradual wavy boundary.

C—40 to 65 inches; red (2.5YR 4/8) loam saprolite; massive; very friable; slightly sticky, slightly plastic; common fine black concretions; common fine flakes of mica; very strongly acid.

**Range in Characteristics***Thickness of the solum:* 20 to 45 inches*Depth to bedrock:* More than 60 inches*Content of mica flakes:* None to common in the A and B horizons and few to many in the C horizon*Content and size of rock fragments:* Less than 15 percent by volume; mostly gravel*Reaction:* Very strongly acid to slightly acid in the A horizon, except where limed, and very strongly acid to moderately acid in the B and C horizons*A or Ap horizon:*

Color—hue of 5YR to 10YR, value of 3 to 5, and chroma of 1 to 4

Texture—loam

*Bt horizon:*

Color—hue of 10R or 2.5YR, value of 4 or 5, and chroma of 6 to 8

Mottles (if they occur)—shades of brown or yellow  
Texture—clay loam, sandy clay, or clay

*BC horizon:*

Color—hue of 10R to 5YR, value of 4 or 5, and chroma of 6 to 8

Mottles (if they occur)—shades of brown or yellow  
Texture—sandy loam, loam, sandy clay loam, or clay loam

*C horizon:*

Color—horizon is multicolored in shades of red, brown, or yellow or has hue of 10R to 5YR, value of 4 or 5, and chroma of 6 to 8

Mottles (if they occur)—shades of brown or yellow  
Texture—sandy loam, fine sandy loam, loam, sandy clay loam, or clay loam saprolite

**Picture Series***Depth class:* Deep*Drainage class:* Poorly drained (fig. 22)*Permeability:* Very slow*Parent material:* Residuum weathered from mafic intrusive rocks*Landscape:* Piedmont uplands*Landform:* Broad upland flats and interstream divides*Slope:* 0 to 3 percent*Taxonomic class:* Fine, montmorillonitic, thermic Vertic Argiaquolls**Typical Pedon**

Picture loam, 0 to 3 percent slopes; 0.2 mile northwest of Butner on Secondary Road 1103, about 0.6 mile southwest on Secondary Road 1111, about 200 feet southeast of the road, in an area of woodland; Creedmoor USGS topographic quadrangle; lat. 36 degrees 07 minutes 18 seconds N. and long. 78 degrees 44 minutes 57 seconds W.

A—0 to 3 inches; very dark gray (10YR 3/1) loam, gray (10YR 5/1) dry; moderate fine granular structure; very friable; slightly sticky, nonplastic; common fine and medium roots; common fine pores; very strongly acid; clear smooth boundary.

AB—3 to 7 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; few fine distinct strong brown (7.5YR 4/6) mottles; moderate fine subangular blocky structure; friable; slightly sticky, slightly plastic; few fine and medium roots; common fine pores; common fine distinct black concretions; strongly acid; gradual wavy boundary.

Btg1—7 to 17 inches; very dark grayish brown (10YR 3/2) clay loam, dark gray (10YR 4/1) dry; weak coarse subangular blocky structure; firm; moderately sticky, moderately plastic; few fine and

medium roots; few fine pores; few distinct clay films on faces of peds and in pores; common fine and medium distinct black concretions; moderately acid; clear wavy boundary.

**Btg<sub>2</sub>**—17 to 24 inches; dark grayish brown (2.5Y 4/2) clay; weak coarse subangular blocky structure; very firm; very sticky, very plastic; few fine roots; common very fine pores; common distinct clay films on faces of peds and in pores; few fine and medium distinct black concretions; slightly acid; clear wavy boundary.

**BCg**—24 to 31 inches; 55 percent dark grayish brown (2.5Y 4/2), 25 percent light olive brown (2.5Y 5/4), and 20 percent strong brown (7.5YR 5/8) clay; weak medium and coarse subangular blocky structure; firm; moderately sticky, moderately plastic; few fine roots; few fine pores; common fine and medium black concretions; 10 percent gravel by volume; iron depletions occurring as areas in shades of gray and brown and iron accumulations occurring as areas in shades of brown; neutral; gradual wavy boundary.

**Cg**—31 to 49 inches; 65 percent dark grayish brown (2.5Y 4/2), 20 percent light olive brown (2.5Y 5/4), and 15 percent strong brown (7.5YR 5/8) sandy loam saprolite; massive; friable; slightly sticky, nonplastic; 5 percent gravel by volume; iron depletions occurring as areas in shades of gray and brown and iron accumulations occurring as areas in shades of brown; alkaline; gradual wavy boundary.

**Cr**—49 to 62 inches; weathered, multicolored diabase that can be dug by a spade with difficulty.

#### Range in Characteristics

*Thickness of the solum:* 20 to 50 inches

*Depth to bedrock:* 40 to 60 inches to soft bedrock and more than 60 inches to hard bedrock

*Content of mica flakes:* None or few

*Content and size of rock fragments:* Less than 15 percent by volume; mostly gravel

*Reaction:* Very strongly acid to neutral in the A and B horizons and moderately acid to slightly alkaline in the C horizon

#### *A or Ap horizon:*

Color—hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 to 3

Mottles (if they occur)—shades of brown, yellow, olive, or gray

Texture—loam

#### *AB horizon:*

Color—hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 to 3

Mottles—shades of brown, yellow, olive, or gray

Texture—sandy loam, fine sandy loam, loam, sandy clay loam, or clay loam

#### *Btg or Btssg horizon:*

Color—horizon has hue of 10YR to 5Y, value of 3 to 6, and chroma of 1 or 2 or is neutral in hue and has value of 4 to 7

Mottles (if they occur)—shades of brown, yellow, olive, or gray

Texture—clay loam, sandy clay, silty clay, or clay

#### *BCg horizon:*

Color—horizon has hue of 10YR to 5Y, value of 3 to 8, and chroma of 1 or 2, is neutral in hue and has value of 4 to 8, or is mottled with dominant chroma of 0 to 2

Mottles (if they occur)—shades of brown, yellow, olive, or gray

Texture—sandy clay loam, clay loam, sandy clay, silty clay, or clay

#### *Cg horizon:*

Color—horizon has hue of 10YR to 5Y, value of 3 to 8, and chroma of 1 or 2, is neutral in hue and has value of 4 to 8, or is mottled with dominant chroma of 0 to 2

Mottles (if they occur)—shades of brown, yellow, olive, or gray

Texture—sandy loam, sandy clay loam, clay loam, sandy clay, or silty clay saprolite

#### *Cr layer:*

Type of bedrock—weathered, multicolored mafic intrusive rocks that can be dug by hand tools with difficulty

### **Pinkston Series**

*Depth class:* Moderately deep

*Drainage class:* Well drained

*Permeability:* Moderately rapid

*Parent material:* Residuum weathered from interbedded sedimentary rocks

*Landscape:* Piedmont uplands

*Landform:* Narrow hill slopes

*Slope:* 10 to 20 percent

*Taxonomic class:* Coarse-loamy, mixed, thermic Ruptic-Ultic Dystrochrepts

#### **Typical Pedon**

Pinkston loamy sand, 10 to 20 percent slopes; 1.6 miles southeast of Butner on Secondary Road 1103, about 400 feet southwest on Secondary Road 1103, about 200 feet northeast, in an area of woodland; Creedmoor USGS topographic quadrangle; lat. 36 degrees 06 minutes 32 seconds N. and long. 78 degrees 43 minutes 54 seconds W.

- Oe—1 inch to 0; partially decomposed hardwood leaf litter.
- Ap—0 to 6 inches; brown (10YR 5/3) loamy sand; weak medium granular structure; very friable; nonsticky, nonplastic; many fine and very fine roots; very strongly acid; abrupt smooth boundary.
- E—6 to 13 inches; brownish yellow (10YR 6/6) sandy loam; weak fine subangular blocky structure; very friable; slightly sticky, nonplastic; very strongly acid; gradual wavy boundary.
- Bw/Bt—13 to 24 inches; 70 percent yellowish brown (10YR 5/4) sandy loam and 30 percent strong brown (7.5YR 5/6) clay loam; weak fine subangular blocky structure (Bw); moderate medium subangular blocky structure (Bt); friable; nonsticky, nonplastic (Bw); slightly sticky, slightly plastic (Bt); few fine and medium roots; very strongly acid; gradual wavy boundary.
- C—24 to 32 inches; multicolored sandy loam saprolite in shades of brown, yellow, and white; massive; very friable; nonsticky, nonplastic; very strongly acid; gradual wavy boundary.
- R—32 inches; unweathered arkosic sandstone.

### Range in Characteristics

- Thickness of the solum:* 12 to 30 inches
- Depth to bedrock:* 20 to 40 inches to hard bedrock
- Content of mica flakes:* None
- Content and size of rock fragments:* Less than 15 percent by volume in the A and B horizons and less than 50 percent in the C horizon; mostly gravel
- Reaction:* Very strongly acid or strongly acid throughout the profile, except where the surface layer has been limed
- Ap or A horizon:*  
 Color—hue of 5YR to 2.5Y, value of 3 to 5, and chroma of 1 to 4  
 Texture (fine-earth fraction)—loamy sand
- E horizon:*  
 Color—hue of 2.5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 6  
 Texture (fine-earth fraction)—sandy loam, very fine sandy loam, fine sandy loam, loam, or silt loam
- B horizon:*  
 Color—hue of 2.5YR to 10YR, value of 3 to 7, and chroma of 2 to 8  
 Texture (Bw part)—sandy loam, fine sandy loam, very fine sandy loam, loam, or silt loam  
 Texture (Bt part)—sandy clay loam, clay loam, or silty clay loam
- C horizon:*  
 Color—multicolored in shades of brown, yellow, pink, purple, red, or white

Texture (fine-earth fraction)—very fine sandy loam, sandy loam, fine sandy loam, loam, or silt loam saprolite

### R layer:

Type of bedrock—unweathered, interbedded sedimentary rock

## Rion Series

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Parent material:* Residuum weathered from felsic intrusive rocks

*Landscape:* Piedmont uplands

*Landform:* Narrow hill slopes

*Slope:* 8 to 30 percent

*Taxonomic class:* Fine-loamy, mixed, thermic Typic Hapludults

### Typical Pedon

Rion sandy loam in an area of Rion-Wateree-Wedowee complex, 8 to 15 percent slopes; 8 miles northeast of Wilton on Secondary Road 1627, about 1,000 feet east on Secondary Road 1627, about 300 feet south of Secondary Road 1627, in an area of woodland; Wilton USGS topographic quadrangle; lat. 36 degrees 09 minutes 26 seconds N. and long. 78 degrees 31 minutes 08 seconds W.

- Oe—1 inch to 0; partially decomposed hardwood leaf litter.
- A1—0 to 5 inches; very dark grayish brown (10YR 3/2) sandy loam; moderate fine granular structure; very friable; few medium and common fine roots; moderately acid; abrupt smooth boundary.
- A2—5 to 8 inches; brown (10YR 4/3) sandy loam; moderate fine granular structure; very friable; common very fine and fine and few medium and coarse roots; moderately acid; clear smooth boundary.
- E—8 to 16 inches; brownish yellow (10YR 6/6) sandy loam; moderate fine granular structure; very friable; common very fine and fine and few coarse roots; strongly acid; clear smooth boundary.
- Bt—16 to 26 inches; yellowish brown (10YR 5/6) clay loam; very coarse subangular blocky structure; firm; slightly sticky, slightly plastic; common fine roots; few faint dark yellowish brown (10YR 4/6) clay films on faces of peds; few fine mica flakes; very strongly acid; gradual wavy boundary.
- BC—26 to 34 inches; yellowish brown (10YR 5/6) sandy clay loam; common fine black, white, and yellow streaks; weak coarse subangular blocky structure;

very friable; slightly sticky, slightly plastic; strongly acid; gradual wavy boundary.

C—34 to 65 inches; multicolored sandy clay loam saprolite in shades of brown, yellow, and white; massive; very friable; very strongly acid.

### Range in Characteristics

*Thickness of the solum:* 20 to 40 inches

*Depth to bedrock:* More than 60 inches

*Reaction:* Very strongly acid to slightly acid throughout the profile, except where the surface layer has been limed

*Content of mica flakes:* None to common

*Content and size of rock fragments:* Less than 15 percent by volume; mostly gravel

*A horizon:*

Color—hue of 5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 6

Texture—loam

*E horizon:*

Color—hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 6

Texture—loamy sand, sandy loam, fine sandy loam, or loam

*Bt horizon:*

Color—hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 4 to 8

Texture—sandy loam, fine sandy loam, sandy clay loam, or clay loam

*BC horizon:*

Color—hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 4 to 8

Mottles—shades of red, brown, yellow, gray, or white

Texture—sandy loam, fine sandy loam, loam, sandy clay loam, or clay loam

*C horizon:*

Color—horizon has hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 4 to 8 or is multicolored in shades of red, brown, yellow, or white

Texture (fine-earth fraction)—loamy sand, coarse sandy loam, sandy loam, fine sandy loam, or sandy clay loam saprolite

*Cr layer (if it occurs):*

Type of bedrock—weathered, multicolored felsic intrusive rock that can be dug by hand tools with difficulty

### Tatum Series

*Depth class:* Deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Parent material:* Residuum weathered from mixed felsic and mafic volcanic rocks

*Landscape:* Piedmont uplands

*Landform:* Hill slopes

*Slope:* 10 to 25 percent

*Taxonomic class:* Clayey, mixed, thermic Typic Hapludults

### Typical Pedon

Tatum loam, 10 to 25 percent slopes; 1.5 miles east of Jonathan Crossroads on Secondary Road 1400, about 0.6 mile north on a farm road, 75 feet southwest of the farm road, in an area of second-growth woodland; Nelson USGS topographic quadrangle; lat. 36 degrees 31 minutes 19 seconds N. and long. 78 degrees 39 minutes 18 seconds W.

Ap—0 to 5 inches; strong brown (7.5YR 5/6) loam; moderate medium granular structure; very friable; very strongly acid; clear smooth boundary.

Bt—5 to 31 inches; red (2.5YR 5/8) clay; moderate medium subangular blocky structure; firm; moderately sticky, slightly plastic; few faint clay films on faces of peds; very strongly acid; clear wavy boundary.

BC—31 to 40 inches; red (2.5YR 5/8) silty clay loam; weak medium subangular blocky structure; very friable; slightly sticky, slightly plastic; very strongly acid; gradual wavy boundary.

C—40 to 58 inches; yellowish red (5YR 5/8) silty clay loam saprolite; massive; very friable; slightly sticky, slightly plastic; very strongly acid; gradual wavy boundary.

Cr—58 to 70 inches; weathered, multicolored, fractured schist that can be dug by a spade with difficulty.

### Range in Characteristics

*Thickness of the solum:* 30 to 60 inches

*Depth to bedrock:* 40 to 60 inches to soft bedrock and more than 60 inches to hard bedrock (fig. 23)

*Content of mica flakes:* None to common

*Content and size of rock fragments:* Less than 15 percent by volume; mostly gravel

*Reaction:* Very strongly acid or strongly acid throughout the profile, except where the surface layer has been limed

*Ap or A horizon:*

Color—hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 8

Texture—loam

*E horizon (if it occurs):*

Color—hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 to 6

Texture—silt loam or fine sandy loam



**Bt horizon:**

Color—hue of 10R or 2.5YR, value of 4 or 5, and chroma of 6 to 8

Mottles—shades of red, brown, or yellow

Texture—clay loam, silty clay loam, silty clay, or clay

**BC horizon:**

Color—hue of 10R to 5YR, value of 4 to 6, and chroma of 4 to 8

Mottles—shades of red, brown, or yellow

Texture—silty clay loam, silty clay, clay loam, or clay

**C horizon:**

Color—hue of 10R to 5YR, value of 4 to 6, and chroma of 4 to 8

Texture—loam, silt loam, clay loam, silty clay loam, silty clay, or clay

**Cr layer:**

Type of bedrock—weathered, fractured felsic volcanic rocks that can be dug by hand tools with difficulty

Texture (fine-earth fraction)—variable; commonly loamy

**Excavated areas:**

Color—hue of 2.5YR to 5Y, value of 4 to 7, and chroma of 2 to 8

Texture (fine-earth fraction)—variable; commonly loamy

**Vance Series**

*Depth class:* Very deep

*Drainage class:* Well drained (fig. 24)

*Permeability:* Slow

*Parent material:* Residuum weathered from felsic intrusive rocks

*Landscape:* Piedmont uplands

*Landform:* Ridges, convex knolls, and hill slopes

*Slope:* 2 to 10 percent

*Taxonomic class:* Clayey, mixed, thermic Typic Hapludults

**Typical Pedon**

Vance sandy loam, 2 to 6 percent slopes; 4 miles northeast of Oxford on Secondary Road 1522, about 1,000 feet north of Secondary Road 1521, about 50 feet northwest of the Big Zion Church, in a field; Oxford USGS topographic quadrangle; lat. 36 degrees 21 minutes 12 seconds N. and long. 78 degrees 32 minutes 38 seconds W.

Ap—0 to 9 inches; yellowish brown (10YR 5/4) sandy loam; moderate medium subangular blocky structure; friable; moderately acid; abrupt smooth boundary.

Bt1—9 to 25 inches; brownish yellow (10YR 6/8) clay; few medium prominent red (2.5YR 5/8) mottles; moderate medium subangular blocky structure; very firm; moderately sticky, moderately plastic; many distinct clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt2—25 to 39 inches; brownish yellow (10YR 6/8) clay; common medium distinct red (2.5YR 5/8), yellow (10YR 8/8), and pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; very firm; slightly sticky, moderately plastic; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

BC—39 to 60 inches; brownish yellow (10YR 6/8) clay loam; common medium distinct red (2.5YR 5/8), yellow (10YR 8/8), and white (10YR 8/1) mottles; weak medium subangular blocky structure; firm; slightly sticky, moderately plastic; common lenses of sandy clay loam and clay; few faint clay films on

**Udorthents**

*Depth class:* Deep or very deep

*Drainage class:* Well drained or moderately well drained

*Permeability:* Moderate to slow

*Parent material:* Fill areas—mixtures of natural soil material; excavated areas—variable, depending on the type of underlying bedrock

*Landform:* Mostly uplands and terraces where natural soil material has been excavated or covered by earthy fill material

*Landform:* Variable; commonly in depressional areas or on broad flats in urban areas

*Slope:* 0 to 10 percent

**Range in Characteristics**

*Thickness of the underlying material:* 30 to more than 60 inches

*Bedrock:* Excavated areas—commonly exposed at the soil surface; fill areas—at a depth of 40 to more than 60 inches

*Content of rock fragments:* Variable; commonly 15 to 50 percent

*Size of rock fragments:* Ranging from gravel to stones

*Reaction:* Extremely acid to moderately acid throughout the profile, except where the surface layer has been limed

**Fill areas:**

Color—hue of 2.5YR to 10YR, value of 4 to 7, and chroma of 2 to 8

faces of peds; very strongly acid; gradual wavy boundary.

C—60 to 80 inches; multicolored sandy clay loam saprolite in shades of red, brown, yellow, and white; massive; friable; slightly sticky, slightly plastic; very strongly acid.

#### Range in Characteristics

*Thickness of the solum:* 24 to 40 inches

*Depth to bedrock:* More than 60 inches; commonly more than 72 inches

*Content of mica flakes:* None

*Content and size of rock fragments:* Less than 15 percent by volume in the A and E horizons and less than 10 percent in the B horizon; mostly gravel

*Reaction:* Very strongly acid to moderately acid in the A horizon, except where limed, and very strongly acid or strongly acid in the B and C horizons

#### Ap horizon:

Color—hue of 10YR to 2.5Y, value of 3 to 6, and chroma of 2 to 6

Texture (fine-earth fraction)—sandy loam

#### Bt horizon:

Color—hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8

Mottles (upper part)—shades of red, brown, or yellow

Mottles (lower part)—shades of red, brown, yellow, or gray

Texture—clay loam, sandy clay, or clay

#### BC horizon:

Color—hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8

Mottles—shades of red, brown, yellow, gray, or white

Texture—loam, sandy clay loam, clay loam, sandy clay, or clay

#### C horizon:

Color—multicolored in shades of red, brown, yellow, or white

Texture—variable; commonly sandy loam, loam, sandy clay loam, or clay loam saprolite

### Wateree Series

*Depth class:* Moderately deep

*Drainage class:* Well drained

*Permeability:* Moderately rapid

*Parent material:* Residuum weathered from felsic intrusive rocks

*Landscape:* Piedmont uplands

*Landform:* Hill slopes

*Slope:* 8 to 30 percent

*Taxonomic class:* Coarse-loamy, mixed, thermic Typic Dystrochrepts

#### Typical Pedon

Wateree sandy loam in an area of Wateree-Rion-Wedowee complex, 15 to 30 percent slopes; 0.25 mile northwest of the intersection of Secondary Roads 1627 and 1625, about 200 feet east of Secondary Road 1625, in an area of woodland; Wilton USGS topographic quadrangle; lat. 36 degrees 09 minutes 06 seconds N. and long. 78 degrees 31 minutes 05 seconds W.

A—0 to 4 inches; brown (10YR 5/3) sandy loam; weak fine granular structure; very friable; common fine and coarse and few medium roots; very strongly acid; gradual wavy boundary.

Bw—4 to 21 inches; yellowish brown (10YR 5/4) sandy loam; weak medium subangular blocky structure; very friable; common very fine and fine and few medium roots; very strongly acid; gradual wavy boundary.

C—21 to 37 inches; very pale brown (10YR 7/4) coarse sandy loam saprolite; massive; very friable; few fine roots; very strongly acid.

Cr—37 to 62 inches; weathered, multicolored granite that can be dug by a spade with difficulty.

#### Range in Characteristics

*Thickness of the solum:* 14 to 30 inches

*Depth to bedrock:* 20 to 40 inches to soft bedrock and 40 to more than 60 inches to hard bedrock

*Content of mica flakes:* None to common

*Content and size of rock fragments:* Less than 20 percent by volume in the A and B horizons and less than 35 percent in the C horizon; mostly gravel

*Reaction:* Very strongly acid to moderately acid in the A and B horizons, except where the surface layer has been limed, and extremely acid to moderately acid in the C horizon

#### A horizon:

Color—hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4

Texture (fine-earth fraction)—sandy loam

#### Bw horizon:

Color—hue of 7.5YR or 10YR, value of 4 to 7, and chroma of 4 to 8

Texture (fine-earth fraction)—loamy sand, sandy loam, fine sandy loam, or sandy clay loam

#### C horizon:

Color—multicolored in shades of brown, yellow, white, or black

Texture—sand, fine sand, loamy sand, loamy fine sand, fine sandy loam, or sandy loam saprolite

#### Cr layer:

Type of bedrock—weathered, multicolored felsic

intrusive rock that can be dug by hand tools with difficulty

### **Wedowee Series**

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Parent material:* Residuum weathered from felsic intrusive rocks (fig. 25)

*Landscape:* Piedmont uplands

*Landform:* Ridges and hill slopes

*Slope:* 2 to 30 percent

*Taxonomic class:* Clayey, kaolinitic, thermic Typic Kanhapludults

#### **Typical Pedon**

Wedowee sandy loam, 2 to 6 percent slopes; 2.5 miles east of Wilton on North Carolina Highway 56, about 1.5 miles northeast on Secondary Road 1625, about 1,000 feet north of the intersection of Secondary Roads 1628 and 1625, about 1,000 feet west of Secondary Road 1625, in a field: Wilton USGS topographic quadrangle; lat. 36 degrees 08 minutes 33 seconds N. and long. 78 degrees 31 minutes 18 seconds W.

A—0 to 4 inches; dark grayish brown (10YR 4/2) sandy loam; moderate fine granular structure; very friable; strongly acid; abrupt smooth boundary.

E—4 to 7 inches; brownish yellow (10YR 6/6) coarse sandy loam; weak medium subangular blocky structure; friable; very strongly acid; clear smooth boundary.

Bt—7 to 23 inches; strong brown (7.5YR 5/6) clay; few fine distinct brownish yellow (10YR 6/6) and red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; firm; slightly sticky, slightly plastic; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

BC—23 to 35 inches; strong brown (7.5YR 5/6) clay loam; many fine distinct red (2.5YR 4/6) and common fine distinct brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; friable; slightly sticky, nonplastic; very strongly acid; gradual wavy boundary.

C—35 to 65 inches; multicolored sandy clay loam saprolite in shades of brown, yellow, or white; massive; very friable; very strongly acid.

#### **Range in Characteristics**

*Thickness of the solum:* 20 to 40 inches

*Depth to bedrock:* More than 60 inches; commonly more than 72 inches

*Content of mica flakes:* None or few in the A horizon and the upper part of the B horizon; none to

common in the lower part of the B horizon and in the C horizon

*Content and size of rock fragments:* Less than 15 percent by volume; mostly gravel

*Reaction:* Extremely acid to strongly acid throughout the profile, except where the surface layer has been limed

*A or Ap horizon:*

Color—hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 8

Texture—sandy loam

*E horizon:*

Color—hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 3 to 8

Texture—loamy coarse sand, loamy sand, coarse sandy loam, sandy loam, fine sandy loam, or loam

*BE horizon (if it occurs):*

Color—hue of 5YR to 10YR, value of 4 to 7, and chroma of 3 to 8

Texture—coarse sandy loam, sandy loam, fine sandy loam, loam, sandy clay loam, or clay loam

*Bt horizon:*

Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 6 to 8

Mottles—shades of red, brown, or yellow

Texture—sandy clay loam, clay loam, sandy clay, or clay

*BC horizon:*

Color—hue of 2.5YR to 10YR, value of 5 to 7, and chroma of 4 to 8

Mottles—shades of red, brown, or yellow

Texture—fine sandy loam, loam, sandy clay loam, or clay loam

*C horizon:*

Color—multicolored in shades of red, brown, yellow, or white

Texture—sandy loam, sandy clay loam, clay loam, or sandy clay saprolite

### **Wehadkee Series**

*Depth class:* Very deep

*Drainage class:* Poorly drained

*Permeability:* Moderate

*Parent material:* Alluvial sediments

*Landscape:* Piedmont drainageways

*Landform:* Flood plains

*Slope:* 0 to 2 percent

*Taxonomic class:* Fine-loamy, mixed, nonacid, thermic Typic Fluvaquents

### Typical Pedon

Wehadkee loam in an area of Chewacla and Wehadkee soils, 0 to 2 percent slopes, frequently flooded; 3.4 miles north of Oxford on U.S. Highway 15, about 1 mile east on Secondary Road 1518, about 100 feet south of Secondary Road 1518, in an area of woodland; Oxford USGS topographic quadrangle; lat. 36 degrees 21 minutes 50 seconds N. and long. 78 degrees 33 minutes 59 seconds W.

A1—0 to 3 inches; brown (10YR 5/3) loam; weak fine granular structure; very friable; strongly acid; gradual wavy boundary.

A2—3 to 7 inches; brown (10YR 5/3) loam; common fine distinct brown (7.5YR 3/4) irregularly shaped masses of iron accumulation with clear boundaries in the matrix; moderate fine granular structure; very friable; few fine flakes of mica; strongly acid; clear smooth boundary.

A3—7 to 11 inches; dark gray (N 4/0) loam; common fine distinct dark brown (7.5YR 3/4) and common fine distinct brown (10YR 5/3) irregularly shaped masses of iron accumulation with clear boundaries in the matrix; moderate fine granular structure; very friable; few fine flakes of mica; strongly acid; clear smooth boundary.

A4—11 to 14 inches; dark gray (2.5Y 4/1) silt loam; common medium distinct dark brown (7.5YR 3/4) and brown (10YR 5/3) irregularly shaped masses of iron accumulation with clear boundaries in the matrix; weak fine granular structure; very friable; few fine flakes of mica; strongly acid; clear smooth boundary.

Bg1—14 to 22 inches; dark gray (10YR 4/1) loam; few medium distinct brown (7.5YR 3/4) irregularly shaped masses of iron accumulation with clear boundaries in the matrix; weak coarse subangular blocky structure; friable; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Bg2—22 to 42 inches; gray (5Y 4/1) sandy clay loam; common fine prominent strong brown (7.5YR 5/8)

irregularly shaped masses of iron accumulation with clear boundaries in the matrix; weak coarse subangular blocky structure; friable; few fine flakes of mica; moderately acid; gradual wavy boundary.

Cg—42 to 72 inches; gray (5Y 5/1), stratified loamy sand, sand, and sandy loam; few fine prominent greenish gray (5BG 6/1) irregularly shaped iron depletions with clear boundaries in the matrix; massive; friable; few fine flakes of mica; neutral.

### Range in Characteristics

*Thickness of the solum:* 20 to more than 60 inches

*Depth to bedrock:* More than 60 inches; commonly more than 120 inches

*Content of mica flakes:* Few to many

*Content and size of rock fragments:* Less than 15 percent by volume; mostly gravel

*Reaction:* Very strongly acid to neutral

*A or Ap horizon:*

Color—horizon is neutral in hue or has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 0 to 4

Redoximorphic features—iron accumulations in shades of brown

Texture—loam

*Bg horizon:*

Color—horizon is neutral in hue or has hue of 10YR to 5Y, value of 4 to 6, and chroma of 0 to 2

Redoximorphic features—iron accumulations in shades of yellow, brown, or red

Texture—loam, silt loam, sandy clay loam, clay loam, or silty clay loam

*Cg horizon:*

Color—horizon is neutral in hue or has hue of 10YR to 5Y, value of 4 to 7, and chroma of 0 to 2

Redoximorphic features—iron or clay depletions in shades of gray or brown and iron accumulations in shades of yellow, brown, or red

Texture—variable; commonly sandy loam or loam; stratified gravel, sand, loamy sand, sandy clay loam, or clay loam below a depth of 40 inches

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# Glossary

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**Aeration, soil.** The exchange of air in soil with air from the atmosphere. The air in a well-aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

**Aggregate, soil.** Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

**Alluvium.** Material, such as sand, silt, or clay, deposited on land by streams.

**Area reclaim** (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

**Argillite.** A compact rock formed from indurated mudstone or shale.

**Association, soil.** A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

**Atterberg limits.** Atterberg limits are measured for soil materials passing the No. 40 sieve. They include the liquid limit (LL), which is the moisture content at which the soil passes from a plastic to a liquid state, and the plastic limit (PL), which is the water content corresponding to an arbitrary limit between the plastic and semisolid states of consistency of a soil.

**Available water capacity (available moisture capacity).** The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low .....	0 to 3
Low .....	3 to 6
Moderate .....	6 to 9
High .....	9 to 12
Very high .....	more than 12

**Base saturation.** The degree to which material having cation-exchange properties is saturated with

exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

**Bedrock.** The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

**Biotite.** A common rock-forming mineral consisting primarily of ferromagnesian silicate minerals. Color ranges from dark brown to green in thin section. Biotite is commonly referred to as "black mica" because of the natural black color.

**Bottom land.** The normal flood plain of a stream, subject to flooding.

**Boulders.** Rock fragments larger than 2 feet (60 centimeters) in diameter.

**Cation.** An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

**Cation-exchange capacity.** The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

**Clay.** As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

**Clayey.** Generally, a broad textural term that includes sandy clay, silty clay, and clay. According to family level criteria in the soil taxonomic system, a specific textural name referring to fine earth (particles less than 2 millimeters in size) containing 35 percent or more clay, by weight, within the control section. The content of rock fragments is less than 35 percent, by volume.

**Clay film.** A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

**CMAI (cumulative mean annual increment).** The age or rotation at which growing stock of a forest produces the greatest annual growth (for that time

period). It is the age at which periodic annual growth and mean annual growth are equal.

**Coarse fragments.** If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

**Coastal Plain.** The physiographic region of eastern North Carolina that consists of ocean-deposited sediments of sand, silt, and clay. These areas of sediments are level to rolling and vary in thickness.

**Complex, soil.** A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

**Concretions.** Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

**Conglomerate.** A detrital sedimentary rock made up of rounded waterworn fragments of rock or pebbles cemented by another mineral substance.

**Conservation tillage.** A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

**Consistence, soil.** The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

*Loose.*—Noncoherent when dry or moist; does not hold together in a mass.

*Friable.*—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

*Firm.*—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

*Plastic.*—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a “wire” when rolled between thumb and forefinger.

*Sticky.*—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

*Hard.*—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

*Soft.*—When dry, breaks into powder or individual grains under very slight pressure.

*Cemented.*—Hard; little affected by moistening.

**Contour stripcropping.** Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

**Control section.** The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

**Cover crop.** A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

**Crop residue management.** Use of that portion of the plant or crop left in the field after harvest for protection or improvement of the soil.

**Cutbanks cave** (in tables). The walls of excavations tend to cave in or slough.

**Dbh (diameter at breast height).** The diameter of a tree at 4.5 feet above the ground level on the uphill side.

**Deferred grazing.** Postponing grazing or resting grazing land for a prescribed period.

**Delineation.** The process of drawing or plotting features on a map with lines and symbols.

**Depression (or depressional area).** A portion of land surrounded on all sides by higher lands. These areas generally do not have outlets for drainage.

**Depth class.** Refers to the depth to a root-restricting layer. Unless otherwise stated, this layer is understood to be consolidated bedrock. The depth classes in this survey are:

Very shallow .....	less than 10 inches
Shallow .....	10 to 20 inches
Moderately deep .....	20 to 40 inches
Deep .....	40 to 60 inches
Very deep .....	more than 60 inches

**Depth to rock** (in tables). Bedrock is too near the surface for the specified use.

**Diabase.** A basaltic rock consisting primarily of labradorite and pyroxene and characterized by ophitic texture.

**Dike.** A long, narrow, cross-cutting mass of igneous rock that extends to or crops out on the land surface.

**Diorite.** A coarse grained igneous rock with the composition of andesite (no quartz or orthoclase). It is composed of about 75 percent plagioclase feldspars with the balance being ferromagnesian silicates.

**Dispersion** (soils). The breakup of compound particles, such as soil aggregates or saprolite, into single grains, which thus causes a highly erosive

condition. This process is the result of the inability of grains to adhere or bond to one another and generally is associated with a high water content in a soil containing high levels of sodium.

**Diversion (or diversion terrace).** A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

**Drainage class (natural).** Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

*Excessively drained.*—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

*Somewhat excessively drained.*—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

*Well drained.*—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

*Moderately well drained.*—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

*Somewhat poorly drained.*—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

*Poorly drained.*—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free

water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

*Very poorly drained.*—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

**Drainage, surface.** Runoff, or surface flow of water, from an area.

**Engineering index test data.** Laboratory test and mechanical analysis of selected soils in the county.

**Eroded (soil phase).** Soils that have lost through erosion an average of 25 to 75 percent of the original A horizon or the uppermost 2 to 6 inches if the original A horizon was less than 8 inches thick.

**Erosion.** The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

*Erosion (geologic)*—Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

*Erosion (accelerated)*—Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as fire, that exposes the surface.

**Erosion classes.** Classes based on estimates of past erosion. The classes are as follows:

*Class 1.*—Soils that have lost some of the original A horizon but on the average less than 25 percent of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick). Throughout most areas of class 1 erosion, the thickness of the surface layer is within the normal range of variability of the uneroded soil. Class 1 erosion typically is not designated in the name of the map unit.

*Class 2.*—Soils that have lost an average of 25 to 75 percent of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick). Throughout most

cultivated areas of class 2 erosion, the surface layer consists of a mixture of the original A horizon and material from below. Some areas may have intricate patterns ranging from uneroded spots to spots where all of the original A horizon has been removed.

*Class 3.*—Soils that have lost an average of 75 percent or more of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick). In most cultivated areas of class 3 erosion, material that was below the original A horizon is exposed at the surface. The plow layer consists entirely or largely of this material.

*Class 4.*—Soils that have lost all of the A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick) plus some or all of the deeper horizons throughout most of the area. The original soil can be identified only in spots. Some areas may be smooth, but most have an intricate pattern of gullies.

**Erosion hazard.** Terms describing the potential for future erosion, inherent in the soil itself, in inadequately protected areas. The following definitions are based on estimated annual soil loss in tons per acre (values determined by the Universal Soil Loss Equation assuming bare soil conditions and using rainfall and climate factors for North Carolina):

0 tons per acre .....	none
Less than 1 ton per acre .....	slight
1 to 5 tons per acre .....	moderate
5 to 10 tons per acre .....	severe
More than 10 tons per acre .....	very severe

**Excess fines** (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

**Fall line.** The boundary between the Coastal Plain and Piedmont physiographic regions. It is a zone of transition and varies considerably in width. The uplands are commonly Coastal Plain sediments, and the bottom of stream channels are hard Piedmont rock. The term “fall line” relates to the falls common in the rocky channels.

**Fanglomerate.** A sedimentary rock that was originally deposited in an alluvial fan and later became cemented into solid rock.

**Fast intake** (in tables). The movement of water into the soil is rapid.

**Fault.** A rupture of rock along which differential movement has occurred.

**Felsic rock.** A general term for light-colored igneous rock and some metamorphic crystalline rock that

have an abundance of quartz, feldspars, feldspathoids, and muscovite mica.

**Fertility, soil.** The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

**Fine textured soil.** Sandy clay, silty clay, or clay.

**Flooding.** The temporary covering of the soil surface by flowing water from any source, such as overflowing streams, runoff from adjacent or surrounding slopes, and inflow from high tides. The frequency of flooding generally is expressed as none, rare, occasional, or frequent. *None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). The duration of flooding is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month).

**Flood plain.** A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

**Flowrock.** Rocks formed from the outpouring of lava.

**Fluvial.** Of or pertaining to rivers; produced by river action, as a fluvial plain.

**Forest type.** A classification of forest land based on the species forming the majority of live-tree stocking.

**Genesis, soil.** The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

**Geomorphic surface.** A part of the land surface representing an episode of landscape development and consisting of one or more landforms. It is a mappable part of the land surface and is defined in terms of morphology, such as relief, slope, and aspect; of origin, such as erosional and constructional; of age, such as absolute and relative; and of stability of component landforms.

**Gneiss.** A coarse grained metamorphic rock in which bands rich in granular minerals alternate with bands that are predominantly schistose minerals. It is commonly formed by the metamorphism of granite. Varieties are distinguished by

characteristic minerals, for example, hornblende gneiss.

**Granite.** A coarse grained igneous rock dominated by light-colored minerals, consisting of about 50 percent orthoclase and 25 percent quartz with the balance being plagioclase feldspars and ferromagnesian silicates. Granites and granodiorites comprise 95 percent of all intrusive rocks.

**Granodiorite.** A group of coarse grained plutonic rocks that are intermediate in composition between quartz diorite and quartz monzonite.

**Grassed waterway.** A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

**Gravel.** Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

**Gravelly soil material.** Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

**Ground water** (geology). Water filling all the unblocked pores of the material below the water table.

**Hill slope.** The steep part of a hill between the summit and the drainage line, valley flat, or depression floor at the base of the hill. In descending order, positions of a simple hill slope are the summit, shoulder, back slope, foot slope, and toe slope. All of these components, however, do not necessarily occur in the continuum of any given hill slope.

**Horizon, soil.** A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:  
*O horizon.*—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

*A horizon.*—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

*E horizon.*—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

*B horizon.*—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of

transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

*C horizon.*—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

*Cr layer.*—Soft, consolidated bedrock beneath the soil.

*R layer.*—Consolidated rock (unweathered bedrock) beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

**Hornblende.** A rock-forming ferromagnesian silicate mineral of the amphibole group.

**Hornblende diorite.** A group of plutonic rocks that consist of diorite but have an appreciable amount of hornblende.

**Hydrologic soil groups.** Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

**Igneous rock.** Rock formed by solidification from a molten or partially molten state. It generally is crystalline in nature.

**Intermediate rock.** Igneous or metamorphic crystalline rock that is intermediate in composition between mafic and felsic rock.



**Interstream divide (or interstream area).** The nearly level land between drainageways in relatively undissected parts of the Coastal Plain. It is in areas on uplands, low marine terraces, and stream terraces. Soils in these areas are generally poorly drained or very poorly drained.

**Intrusive rock.** Rocks formed through the emplacement of magma in preexisting rock.

**Irrigation.** Application of water to soils to assist in production of crops. Methods of irrigation are:  
*Border.*—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

*Drip (or trickle).*—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

*Sprinkler.*—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

**Kaolinite.** An aluminosilicate clay mineral that has a 1:1 layer structure. It consists of a silicon tetrahedral sheet alternating with an aluminum octahedral sheet. Little or no expansion occurs when water mixes with the clay.

**Knoll.** A small, low, rounded hill rising above adjacent landforms.

**Large stones** (in tables). Rock fragments that are 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

**Leaching.** The removal of soluble material from soil or other material by percolating water.

**Liquid limit.** The moisture content at which the soil passes from a plastic to a liquid state.

**Loam.** Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

**Loamy.** Generally, a broad textural term that includes coarse sandy loam, sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silt, clay loam, sandy clay loam, and silty clay loam. According to family level criteria in the soil taxonomic system, a specific textural name referring to fine earth (particles less than 2 millimeters in size) of loamy very fine sand or finer textured material that contains less than 35 percent clay, by weight, within the control section. The content of rock fragments is less than 35 percent, by volume.

**Loess.** Fine grained material, dominantly of silt-sized particles, deposited by the wind.

**Low strength.** The soil is not strong enough to support loads.

**Mafic rock.** A general term for dark igneous rock and some metamorphic crystalline rock that are composed predominantly of magnesium silicates. Mafic rock contains little quartz, feldspar, or muscovite mica.

**Mean annual increment.** The average yearly volume of a stand of trees from the year of origin to the age under consideration.

**Medium textured soil.** Very fine sandy loam, loam, silt loam, or silt.

**Metamorphic rock.** Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

**Metavolcanics.** Volcanic rocks that have been subjected to metamorphism.

**Micas.** A group of silicate minerals characterized by sheet or scale cleavage. Biotite is the ferromagnesian black mica. Muscovite is the potassium-rich white mica.

**Mineral soil.** Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

**Minimum tillage.** Only the tillage essential to crop production and prevention of soil damage.

**Miscellaneous area.** An area that has little or no natural soil and supports little or no vegetation.

**Montmorillonite.** An aluminosilicate clay mineral that has a 2:1 layer structure. It consists of two silicon tetrahedral sheets enclosing an aluminum octahedral sheet. Considerable expansion can occur when water mixes with the clay.

**Morphology, soil.** The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

**Mottling, soil.** Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

**Muck.** Dark, finely divided, well-decomposed organic soil material. (See Sapric soil material.)

**Mudstone.** Fine grained, detrital sedimentary rock consisting of silt- and clay-sized particles. It is



distinguished from shale by lack of fissility.

**Munsell notation.** A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

**Muscovite.** A nonferromagnesian rock-forming silicate mineral that has tetrahedra arranged in sheets. It is commonly called “white mica” and sometimes called “potassic mica.”

**Native pasture.** Pasture on slopes so steep that it cannot be managed with modern machinery. It has seeded naturally in native grasses.

**Neutral soil.** A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

**Nose slope.** The downward-sloping convex end of a main ridge or spur ridge.

**No-till planting.** A method of planting crops in which there is virtually no seedbed preparation. A thin slice of the soil is opened, and the seed is planted at the desired depth.

**Nutrient, plant.** Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

**Organic matter.** Plant and animal residue in the soil in various stages of decomposition.

**Overland flow.** A buildup of water on the soil surface, usually the result of heavy rainfall and slow infiltration.

**Overstory.** The portion of the trees in a forest stand forming the upper crown cover.

**Parent material.** The unconsolidated organic and mineral material in which soil forms.

**Ped.** An individual natural soil aggregate, such as a granule, a prism, or a block.

**Pedon.** The smallest volume that can be called “a soil.” A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

**Percolation.** The downward movement of water through the soil.

**Percs slowly** (in tables). The slow movement of water through the soil adversely affects the specified use.

**Permeability.** The quality of the soil that enables water to move through the profile. Permeability is measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeability are:

Very slow .....	less than 0.06 inch
Slow .....	0.06 to 0.2 inch
Moderately slow .....	0.2 to 0.6 inch
Moderate .....	0.6 inch to 2.0 inches
Moderately rapid .....	2.0 to 6.0 inches
Rapid .....	6.0 to 20 inches
Very rapid .....	more than 20 inches

**Phase, soil.** A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and thickness.

**pH value.** A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

**Phyllite.** A metamorphic rock that is intermediate in grade between slate and mica schist.

**Piedmont.** The physiographic region of central North Carolina characterized by rolling landscapes formed from the weathering of residual rock material.

**Piping** (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

**Plasticity index.** The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

**Plastic limit.** The moisture content at which a soil changes from semisolid to plastic.

**Pluton.** A body of igneous rock that is formed beneath the earth's surface by consolidation from magma. In some cases the term also includes bodies formed beneath the earth's surface by the metasomatic replacement of older rock.

**Poorly graded.** Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

**Porphyritic.** A textural term for igneous rocks that contain larger crystals, called phenocrysts, in a finer textured groundmass. The groundmass may be crystalline or glassy, or both.

**Productivity, soil.** The capability of a soil for producing a specified plant or sequence of plants under specific management.

**Profile, soil.** A vertical section of the soil extending through all its horizons and into the parent material.

**Quartz diorite.** A group of plutonic rocks that consist of diorite but have an appreciable amount of quartz.

**Quartz monzonite.** A granitic rock in which quartz makes up 10 to 50 percent of the felsic constituents and in which the alkali feldspar to total feldspar content ratio is between 35 and 65 percent.

**Reaction, soil.** A measure of the acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid.....	below 3.5
Extremely acid .....	3.5 to 4.4
Very strongly acid .....	4.5 to 5.0
Strongly acid.....	5.1 to 5.5
Moderately acid .....	5.6 to 6.0
Slightly acid.....	6.1 to 6.5
Neutral .....	6.6 to 7.3
Slightly alkaline .....	7.4 to 7.8
Moderately alkaline.....	7.9 to 8.4
Strongly alkaline .....	8.5 to 9.0
Very strongly alkaline .....	9.1 and higher

**Redoximorphic concentrations.** Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. They indicate chemical reduction and oxidation resulting from saturation.

**Redoximorphic depletions.** Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. They indicate the chemical reduction of iron resulting from saturation.

**Redoximorphic features.** Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

**Reduced matrix.** A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

**Reforestation.** The process in which tree seedlings are planted or become naturally established in an area that was once forested.

**Relief.** The elevations or inequalities of a land surface, considered collectively.

**Residuum (residual soil material).** Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

**Rock fragments.** Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

**Rooting depth** (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

**Root zone.** The part of the soil that can be penetrated by plant roots.

**Runoff.** The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

**Runoff class** (surface). The rate at which water flows away from the soil over the surface without infiltrating. Six classes of rate of runoff are recognized:

*Ponded.*—Little of the precipitation and water that runs onto the soil escapes as runoff, and free water stands on the surface for significant periods. The amount of water that is removed from ponded areas by movement through the soil, by plants, or by evaporation is usually greater than the total rainfall. Ponding normally occurs on level and nearly level soils in depressions. The water depth may fluctuate greatly.

*Very slow.*—Surface water flows away slowly, and free water stands on the surface for long periods or immediately enters the soil. Most of the water passes through the soil, is used by plants, or evaporates. Soils with this runoff class are commonly level or nearly level or are very porous.

*Slow.*—Surface water flows away so slowly that free water stands on the surface for moderate periods or enters the soil rapidly. Most of the water passes through the soil, is used by plants, or evaporates. Soils with this runoff class are nearly level or very gently sloping, or they are steeper but absorb precipitation very rapidly.

*Medium.*—Surface water flows away so rapidly that free water stands on the surface for only short periods. Part of the precipitation enters the soil and is used by plants, is lost by evaporation, or moves into underground channels. Soils with this runoff class are nearly level or gently sloping and absorb precipitation at a moderate rate, or they are steeper but absorb water rapidly.

*Rapid.*—Surface water flows away so rapidly that the period of concentration is brief and free water does not stand on the surface. Only a small part of the water enters the soil. Soils with this runoff class are mainly moderately steep or steep and have a moderate or slow rate of absorption.

*Very rapid.*—Surface water flows away so rapidly that the period of concentration is very brief and free water does not stand on the surface. Only a small part of the water enters the soil. Soils with this runoff class are mainly steep or very steep and absorb precipitation slowly.

**Sand.** As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

**Sapric soil material (muck).** The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

**Saprolite** (soil science). Unconsolidated, residual material underlying the soil and grading to hard bedrock below.

**Schist.** A metamorphic rock dominated by fibrous or platy minerals. It has schistose cleavage and is a product of regional metamorphism. Varieties are distinguished by characteristic minerals, for example, muscovite schist and biotite schist.

**Sedimentary rock.** Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

**Seepage** (in tables). The movement of water through the soil adversely affects the specified use.

**Series, soil.** A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

**Shale.** Sedimentary rock formed by the hardening of a clay deposit.

**Shrink-swell.** The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

**Sill.** A tabular igneous intrusion that is parallel to the planar structure of the surrounding rock.

**Silt.** As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

**Siltstone.** Sedimentary rock made up of dominantly silt-sized particles.

**Site index.** A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees

in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

**Slate.** A fine grained metamorphic rock that has well-developed slaty cleavage. Formed by the low-grade regional metamorphism of shale.

**Slope.** The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey area slope classes are as follows:

Nearly level.....	0 to 2 percent
Gently sloping .....	2 to 6 percent
Moderately sloping .....	6 to 10 percent
Strongly sloping.....	10 to 15 percent
Moderately steep .....	15 to 30 percent
Steep.....	30 to 50 percent

**Slope** (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

**Small stones** (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

**Soil.** A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

**Soil compaction.** An alteration of soil structure that ultimately can affect the biological and chemical properties of the soil. Compaction decreases the extent of voids and increases bulk density.

**Soil creep.** The slow mass movement of soil and soil materials downslope, primarily under the influence of gravity, facilitated by water saturation and by alternating freezing and thawing.

**Soil map unit.** A kind of soil or miscellaneous area or a combination of two or more soils or one or more soils and one or more miscellaneous areas that can be shown at the scale of mapping for the defined purposes and objectives of the soil survey. They are generally designed to reflect significant differences in use and management.

**Soil puddling.** A condition occurring on certain soils if machinery is used when the soils are wet. The exertion of mechanical force can destroy the soil structure by compression and shearing and thus result in the rearrangement of soil particles into a massive or nonstructural state.

**Soil separates.** Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in

millimeters, of separates recognized in the United States are as follows:

Very coarse sand.....	2.0 to 1.0
Coarse sand.....	1.0 to 0.5
Medium sand.....	0.5 to 0.25
Fine sand.....	0.25 to 0.10
Very fine sand.....	0.10 to 0.05
Silt.....	0.05 to 0.002
Clay.....	less than 0.002

**Soil strength.** Load-supporting capacity of a soil at specific moisture and density conditions.

**Solum.** The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

**Stones.** Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded and 15 to 24 inches (38 to 60 centimeters) in length if flat.

**Stony.** Refers to a soil containing stones in numbers that interfere with or prevent tillage.

**Structure, soil.** The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

**Subsoil.** Technically, the B horizon; roughly, the part of the solum below plow depth.

**Subsoiling.** Breaking up a compact subsoil by pulling a special chisel through the soil.

**Substratum.** The part of the soil below the solum.

**Subsurface layer.** Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

**Suitability ratings.** Ratings for the degree of suitability of soils for pasture, cropland, woodland, and engineering uses. The ratings and the general criteria used for their selection are as follows:

*Well suited.*—The soils have properties that are favorable for the intended use. There are no soil limitations. Good performance and low maintenance can be expected. The intended use can easily be maintained, improved, or initiated.  
*Suited.*—The soils have properties that are moderately favorable for the intended use. One or

more soil properties make these soils less desirable than those rated well suited. The intended use can be maintained, improved, or initiated, but more intensive management is needed to maintain the resource base.

*Poorly suited.*—The soils have one or more properties that are unfavorable for the intended use. Overcoming the unfavorable property or properties requires special design, extra maintenance, or costly alteration. The intended use is difficult to initiate or maintain.

*Unsuited.*—The expected performance of the soils is unacceptable for the use or extreme measures are needed to overcome the undesirable properties or qualities.

**Surface layer.** The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters).

Frequently designated as the “plow layer,” or the “Ap horizon.”

**Terrace.** An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff, so that water soaks into the soil or flows slowly to a prepared outlet.

**Terrace (geologic).** An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

**Texture, soil.** The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand*, *loamy sand*, *sandy loam*, *loam*, *silt loam*, *silt*, *sandy clay loam*, *clay loam*, *silty clay loam*, *sandy clay*, *silty clay*, and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying “coarse,” “fine,” or “very fine.” The textural classes are defined as follows:

*Sands (coarse sand, sand, fine sand, and very fine sand).*—Soil material in which the content of sand is 85 percent or more and the percentage of silt plus 1½ times the percentage of clay does not exceed 15.

*Loamy sands (loamy coarse sand, loamy sand, loamy fine sand, and loamy very fine sand).*—Soil material in which, at the upper limit, the content of sand is 85 to 90 percent and the percentage of silt plus 1½ times the percentage of clay is not less than 15 and, at the lower limit, the content of sand is 70 to 85 percent and the percentage of silt plus twice the percentage of clay does not exceed 30.

*Sandy loams (coarse sandy loam, sandy loam, fine sandy loam, and very fine sandy loam).*—Soil material in which the content of clay is 20 percent or less, the percentage of silt plus twice the

percentage of clay exceeds 30, and the content of sand is 52 percent or more, or soil material in which the content of clay is less than 7 percent, the content of silt is less than 50 percent, and the content of sand is 43 to 52 percent.

*Loam*.—Soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand.

*Silt loam*.—Soil material that contains 50 or more percent silt and 12 to 27 percent clay or 50 to 80 percent silt and less than 12 percent clay.

*Silt*.—Soil material that contains 80 or more percent silt and less than 12 percent clay.

*Sandy clay loam*.—Soil material that contains 20 to 35 percent clay, less than 28 percent silt, and 45 or more percent sand.

*Clay loam*.—Soil material that contains 27 to 40 percent clay and 20 to 45 percent sand.

*Silty clay loam*.—Soil material that contains 27 to 40 percent clay and less than 20 percent sand.

*Sandy clay*.—Soil material that contains 35 or more percent clay and 45 or more percent sand.

*Silty clay*.—Soil material that contains 40 or more percent clay and 40 or more percent silt.

*Clay*.—Soil material that contains 40 or more percent clay, less than 45 percent sand, and less than 40 percent silt.

**Thin layer** (in tables). An otherwise suitable soil material that is too thin for the specified use.

**Tilth, soil**. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

**Topography**. The relative positions and elevations of the natural or manmade features of an area that describe the configuration of its surface.

**Topsoil**. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

**Triassic**. The earliest of the three geologic periods comprising the Mesozoic era; approximately 225 million years ago to 180 million years ago.

**Tuff**. All consolidated rocks that formed from solid material ejected from a volcanic vent.

**Underlying material**. Technically the C horizon; the part

of the soil below the biologically altered A and B horizons.

**Universal Soil Loss Equation**. An equation used to design systems for controlling water erosion. The equation is  $A = RKLSPC$  wherein A is the average annual soil loss in tons per acre per year, R is the rainfall factor, K is the soil erodibility factor, L is the length of slope, S is the steepness of slope, P is the conservation practice factor, and C is the cropping and management factor.

**Upland** (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

**Valley fill**. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited in stream valleys by heavily loaded streams.

**Water table (apparent)**. A thick zone of free water in the soil. The water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

**Water table (perched)**. A saturated zone of water in the soil standing above an unsaturated zone.

**Water table (seasonal high)**. The highest level of a saturated zone in the soil (the apparent or perched water table) over a continuous period of more than 2 weeks in most years, but not a permanent water table.

**Weathering**. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

**Well graded**. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. This contrasts with poorly graded soil.

**Wetness**. A general term applied to soils that hold water at or near the surface long enough to be a common management problem.

**Windthrow**. The uprooting and tipping over of trees by the wind.





# Tables

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TABLE 1.--TEMPERATURE AND PRECIPITATION  
(Recorded in the period 1951-86 at Oxford, North Carolina)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have--		Average number of growing degree days*	Average	2 years in 10 will have--		Average number of days with 0.10 inch or more	Average snowfall
				Maximum temperature higher than--	Minimum temperature lower than--			Less than--	More than--		
° F	° F	° F	° F	° F	Units	In	In	In		In	
January-----	49.7	29.0	39.4	73	6	26	3.42	1.79	4.83	7	2.7
February-----	53.4	31.3	42.4	76	11	30	3.70	2.13	5.09	7	2.3
March-----	61.9	37.8	49.9	84	20	115	3.93	2.32	5.35	7	1.6
April-----	72.7	46.8	59.8	90	28	297	2.99	1.54	4.24	6	.0
May-----	79.7	55.5	67.6	93	37	546	4.08	2.47	5.51	7	.0
June-----	86.0	63.0	74.5	99	48	735	3.82	1.85	5.52	6	.0
July-----	89.2	66.8	78.0	100	54	868	4.66	2.41	6.61	7	.0
August-----	87.7	66.0	76.9	98	52	834	4.77	2.29	6.90	7	.0
September---	82.4	59.4	70.9	95	42	627	3.27	1.38	4.87	5	.0
October-----	72.5	48.5	60.5	89	28	332	3.09	1.32	4.59	5	.0
November-----	62.5	39.4	51.0	82	20	103	3.26	1.41	4.83	6	.1
December-----	53.0	31.8	42.4	74	10	40	3.39	1.79	4.78	6	.9
Yearly:											
Average---	70.9	47.9	59.4	---	---	---	---	---	---	---	---
Extreme---	---	---	---	101	4	---	---	---	---	---	---
Total-----	---	---	---	---	---	4,553	44.38	38.43	50.08	76	7.6

\* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL  
(Recorded in the period 1951-86 at Oxford, North Carolina)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Mar. 31	Apr. 6	Apr. 21
2 years in 10 later than--	Mar. 24	Apr. 1	Apr. 16
5 years in 10 later than--	Mar. 9	Mar. 22	Apr. 7
First freezing temperature in fall:			
1 year in 10 earlier than--	Nov. 5	Oct. 25	Oct. 13
2 years in 10 earlier than--	Nov. 11	Oct. 31	Oct. 19
5 years in 10 earlier than--	Nov. 22	Nov. 11	Oct. 30

TABLE 3.--GROWING SEASON  
(Recorded in the period 1951-86 at Oxford, North  
Carolina)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	<u>Days</u>	<u>Days</u>	<u>Days</u>
9 years in 10	229	209	184
8 years in 10	239	217	191
5 years in 10	258	233	205
2 years in 10	277	249	219
1 year in 10	287	257	226

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AaA	Altavista loam, 0 to 3 percent slopes, rarely flooded-----	1,630	0.5
ApB	Appling sandy loam, 2 to 6 percent slopes-----	5,037	1.5
ApC	Appling sandy loam, 6 to 10 percent slopes-----	1,664	0.5
AuC	Appling-Urban land complex, 2 to 10 percent slopes-----	2,723	0.8
CaB	Cecil sandy loam, 2 to 6 percent slopes-----	26,100	7.6
CeB2	Cecil clay loam, 2 to 6 percent slopes, eroded-----	2,517	0.7
CeC2	Cecil clay loam, 6 to 10 percent slopes, eroded-----	14,008	4.1
ChA	Chewacla and Wehadkee soils, 0 to 2 percent slopes, frequently flooded-----	22,383	6.5
CoA	Congaree silt loam, 0 to 2 percent slopes, frequently flooded-----	1,233	0.4
CrB	Creedmoor coarse sandy loam, 2 to 6 percent slopes-----	27,578	8.0
CrC	Creedmoor coarse sandy loam, 6 to 10 percent slopes-----	12,604	3.7
EnB	Enon loam, 2 to 6 percent slopes-----	17,157	5.0
EnC	Enon loam, 6 to 10 percent slopes-----	4,095	1.2
GeB	Georgeville silt loam, 2 to 6 percent slopes-----	39,154	11.3
GeC	Georgeville silt loam, 6 to 10 percent slopes-----	19,529	5.7
HeB	Helena sandy loam, 2 to 6 percent slopes-----	17,760	5.2
HeC	Helena sandy loam, 6 to 10 percent slopes-----	855	0.2
HrB	Herndon silt loam, 2 to 6 percent slopes-----	17,814	5.2
HrC	Herndon silt loam, 6 to 10 percent slopes-----	4,177	1.2
IrB	Iredell loam, 2 to 6 percent slopes-----	10,778	3.1
IrC	Iredell loam, 6 to 10 percent slopes-----	786	0.2
IuC	Iredell-Urban land-Picture complex, 0 to 10 percent slopes-----	606	0.2
LmB	Lignum silt loam, 2 to 6 percent slopes-----	20,928	6.1
MaB	Mayodan sandy loam, 2 to 6 percent slopes-----	1,660	0.5
NaB	Nason gravelly loam, 2 to 6 percent slopes-----	10,078	2.9
NaC	Nason gravelly loam, 6 to 10 percent slopes-----	5,256	1.5
NaE	Nason gravelly loam, 10 to 25 percent slopes-----	1,856	0.5
NaF	Nason gravelly loam, 25 to 50 percent slopes-----	440	0.1
PaE	Pacolet sandy loam, 10 to 25 percent slopes-----	5,706	1.7
PaF	Pacolet sandy loam, 25 to 50 percent slopes-----	937	0.3
PcA	Picture loam, 0 to 3 percent slopes-----	3,321	1.0
PnD	Pinkston loamy sand, 10 to 20 percent slopes-----	1,671	0.5
RwD	Rion-Wateree-Wedowee complex, 8 to 15 percent slopes-----	767	0.2
TaE	Tatum loam, 10 to 25 percent slopes-----	7,972	2.3
Ud	Udorthents, loamy-----	1,320	0.4
UrC	Urban land-Iredell-Creedmoor complex, 2 to 10 percent slopes-----	1,779	0.5
VaB	Vance sandy loam, 2 to 6 percent slopes-----	19,207	5.6
VaC	Vance sandy loam, 6 to 10 percent slopes-----	5,460	1.6
WaE	Wateree-Rion-Wedowee complex, 15 to 30 percent slopes-----	821	0.2
WeB	Wedowee sandy loam, 2 to 6 percent slopes-----	1,327	0.4
WeC	Wedowee sandy loam, 6 to 10 percent slopes-----	710	0.2
	Water-----	2,340	0.7
	Total-----	343,744	100.0

TABLE 5.--LAND CAPABILITY, FERTILITY CAPABILITY, AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Fertility capability	Tobacco	Corn	Corn silage	Wheat	Soybeans	Fescue pasture	Grass- legume hay
			<u>Lbs</u>	<u>Bu</u>	<u>Tons</u>	<u>Bu</u>	<u>Bu</u>	<u>AUM*</u>	<u>Tons</u>
AaA----- Altavista	IIw	L h	3,000	125	18	65	50	11.5	7.0
ApB----- Appling	IIe	LC a	2,400	95	15	50	40	8.0	4.8
ApC----- Appling	IIIe	LC a	2,200	80	14	45	35	8.0	4.8
AuC: Appling-----	IIIe	---	---	---	---	---	---	---	---
Urban land-----	VIIIIs	---	---	---	---	---	---	---	---
CaB----- Cecil	IIe	LC a	2,200	95	15	50	40	8.0	4.8
CeB2----- Cecil	IIIe	LC a	2,000	80	14	45	35	8.0	4.8
CeC2----- Cecil	IVe	LC a	1,800	70	12	40	25	5.0	3.0
ChA: Chewacla-----	IVw	L h	---	125	18	30	40	9.0	5.5
Wehadkee-----	VIw	L gh	---	---	---	---	---	7.0	4.2
CoA----- Congaree	IIIw	L h	---	140	20	---	50	11.0	7.0
CrB----- Creedmoor	IIe	LC h	2,200	75	12	40	35	6.0	3.6
CrC----- Creedmoor	IIIe	LC h	2,000	60	10	35	30	5.8	3.5
EnB----- Enon	IIe	LC h	1,900	85	12	40	30	8.5	5.1
EnC----- Enon	IIIe	LC h	1,700	75	12	40	25	8.0	4.8
GeB----- Georgeville	IIe	LC h	2,200	95	15	50	40	9.0	5.4

See footnote at end of table.

TABLE 5.--LAND CAPABILITY, FERTILITY CAPABILITY, AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Fertility capability	Tobacco	Corn	Corn silage	Wheat	Soybeans	Fescue pasture	Grass- legume hay
			<u>Lbs</u>	<u>Bu</u>	<u>Tons</u>	<u>Bu</u>	<u>Bu</u>	<u>AUM*</u>	<u>Tons</u>
GeC----- Georgeville	IIIe	LC h	2,000	85	14	45	35	8.5	5.0
HeB----- Helena	IIe	L h	2,100	80	14	45	35	6.0	3.6
HeC----- Helena	IIIe	L h	1,800	70	12	35	30	5.0	3.0
HrB----- Herndon	IIe	L h	2,200	95	15	50	40	9.0	5.4
HrC----- Herndon	IIIe	L h	2,000	85	14	40	35	8.5	5.0
IrB----- Iredell	IIe	LC h	---	65	10	30	25	7.0	4.2
IrC----- Iredell	IIIe	LC h	---	55	8	25	20	6.0	3.5
IuC: Iredell-----	IIIe	---	---	---	---	---	---	---	---
Urban land----	VIIIIs	---	---	---	---	---	---	---	---
Picture-----	IVw	---	---	---	---	---	---	6.0	---
LmB----- Lignum	IIe	L h	---	100	18	50	40	8.0	4.8
MaB----- Mayodan	IIe	L h	2,100	95	18	50	40	8.0	4.8
NaB----- Nason	IIe	L' h	---	90	18	45	30	8.0	3.0
NaC----- Nason	IIIe	L' h	---	85	17	45	30	7.5	2.5
NaE----- Nason	IVe	L' h	---	---	---	---	---	---	---
NaF----- Nason	VIIe	L' h	---	---	---	---	---	---	---
PaE----- Pacolet	VIe	LC a	---	---	---	---	---	---	---

See footnote at end of table.



TABLE 5.--LAND CAPABILITY, FERTILITY CAPABILITY, AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Fertility capability	Tobacco	Corn	Corn silage	Wheat	Soybeans	Fescue pasture	Grass- legume hay
			<u>Lbs</u>	<u>Bu</u>	<u>Tons</u>	<u>Bu</u>	<u>Bu</u>	<u>AUM*</u>	<u>Tons</u>
PaF----- Pacolet	VIe	LC a	---	---	---	---	---	---	---
PcA----- Picture	IVw	LC gh	---	---	---	---	---	6.0	3.6
PnD----- Pinkston	VIe	SL h	---	---	---	---	---	3.5	2.0
RwD: Rion-----	IVe	L h	---	---	---	---	---	---	---
Wateree-----	VIe	L h	---	---	---	---	---	---	---
Wedowee-----	IVe	LC a	---	---	---	---	---	---	---
TaE----- Tatum	IVe	LC h	---	---	---	---	---	---	---
Ud----- Udorthents	VIIIs	---	---	---	---	---	---	---	---
UrC: Urban land-----	VIIIIs	---	---	---	---	---	---	---	---
Iredell-----	IIIe	---	---	---	---	---	---	---	---
Creedmoor-----	IIIe	---	---	---	---	---	---	---	---
VaB----- Vance	IIIe	LC h	2,000	80	14	45	35	6.0	3.6
VaC----- Vance	IVe	LC h	1,900	75	14	45	30	6.0	3.6
WaE: Wateree-----	VIIe	L h	---	---	---	---	---	---	---
Rion-----	VIe	L h	---	---	---	---	---	---	---
Wedowee-----	VIe	LC a	---	---	---	---	---	---	---
WeB----- Wedowee	IIe	LC a	2,000	80	14	40	35	5.0	3.0
WeC----- Wedowee	IIIe	LC a	1,800	75	14	35	30	5.0	3.0

\* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol <sup>1</sup>	Management concerns					Potential productivity			Trees to plant <sup>4</sup>
		Erosion hazard	Equipment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index <sup>2</sup>	Volume <sup>3</sup>	
AaA----- Altavista	10A	Slight	Slight	Slight	Slight	Moderate	Loblolly pine-----	96	145	Loblolly pine.
							Longleaf pine-----	---	---	
							White oak-----	---	---	
							Shortleaf pine-----	97	128	
							Sweetgum-----	---	---	
							Red maple-----	97	102	
							Yellow-poplar-----	---	---	
							Southern red oak----	---	---	
							Water oak-----	---	---	
							American beech-----	---	---	
							Hickory-----	---	---	
ApB, ApC----- Appling	8A	Slight	Slight	Slight	Slight	Moderate	Loblolly pine-----	84	118	Loblolly pine, shortleaf pine.
							Shortleaf pine-----	63	95	
							Virginia pine-----	77	118	
							Scarlet oak-----	---	---	
							White oak-----	---	---	
							Yellow-poplar-----	81	73	
							Sweetgum-----	---	---	
							Southern red oak----	---	---	
CaB----- Cecil	8A	Slight	Slight	Slight	Slight	Moderate	Loblolly pine-----	83	116	Loblolly pine, shortleaf pine.
							Shortleaf pine-----	67	103	
							Virginia pine-----	71	110	
							White oak-----	78	60	
							Northern red oak----	81	63	
							Southern red oak----	79	61	
							Post oak-----	---	---	
							Scarlet oak-----	81	63	
							Sweetgum-----	---	---	
							Yellow-poplar-----	92	93	
CeB2, CeC2----- Cecil	7C	Slight	Moderate	Moderate	Slight	Moderate	Loblolly pine-----	77	105	Loblolly pine.
							Shortleaf pine-----	62	92	
							Virginia pine-----	68	105	
							White oak-----	67	49	
							Northern red oak----	---	---	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol <sup>1</sup>	Management concerns					Potential productivity			Trees to plant <sup>4</sup>
		Erosion hazard	Equipment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index <sup>2</sup>	Volume <sup>3</sup>	
ChA <sup>5</sup> : Chewacla-----	7W	Slight	Moderate	Slight	Moderate	Severe	Yellow-poplar----- Loblolly pine----- Sweetgum----- Water oak----- Eastern cottonwood-- Green ash----- Southern red oak---- Blackgum----- Red maple----- Willow oak----- American beech----- American sycamore---	96 95 100 90 --- 78 --- --- --- 90 --- 97	100 142 138 86 --- 46 --- --- --- 86 --- 116	Yellow-poplar, loblolly pine, sweetgum, American sycamore, green ash.
Wehadkee-----	8W	Slight	Severe	Moderate	Moderate	Severe	Yellow-poplar----- Sweetgum----- Loblolly pine----- Willow oak----- Water oak----- Green ash----- White ash----- American sycamore--- River birch-----	100 97 93 94 94 89 --- --- ---	107 128 138 91 91 64 --- --- ---	Yellow-poplar, green ash, sweetgum.
CoA----- Congaree	7A	Slight	Moderate	Slight	Slight	Moderate	Loblolly pine----- Sweetgum----- Yellow-poplar----- Cherrybark oak----- Eastern cottonwood-- American sycamore--- Black walnut----- Scarlet oak----- Willow oak----- Green ash----- American beech-----	85 100 98 --- --- --- --- --- --- --- ---	120 138 104 --- --- --- --- --- --- --- ---	Sweetgum, yellow- poplar, American sycamore, black walnut, cherrybark oak, eastern cottonwood.
CrB, CrC----- Creedmoor	9A	Slight	Slight	Slight	Slight	Severe	Loblolly pine----- Yellow-poplar----- Virginia pine----- Shortleaf pine----- Sweetgum----- Water oak----- Red maple----- Red maple-----	87 97 --- 66 --- --- --- ---	125 102 --- 101 --- --- --- ---	Loblolly pine, shortleaf pine.

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol <sup>1</sup>	Management concerns					Potential productivity			Trees to plant <sup>4</sup>
		Erosion hazard	Equipment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index <sup>2</sup>	Volume <sup>3</sup>	
EnB, EnC----- Enon	8A	Slight	Moderate	Slight	Slight	Slight	Loblolly pine----- Shortleaf pine----- Virginia pine----- Northern red oak----- Sweetgum----- White oak----- Yellow-poplar----- Hickory-----	78 57 --- --- 69 --- --- ---	107 82 --- --- 51 --- ---	Loblolly pine, shortleaf pine.
GeB, GeC----- Georgeville	8A	Slight	Moderate	Slight	Slight	Slight	Loblolly pine----- Longleaf pine----- Shortleaf pine----- White oak----- Scarlet oak----- Southern red oak----	81 67 66 72 70 72	112 72 101 54 --- 54	Loblolly pine, shortleaf pine.
HeB, HeC----- Helena	8A	Slight	Slight	Slight	Slight	Severe	Loblolly pine----- Shortleaf pine----- White oak----- Yellow-poplar----- Sweetgum----- Northern red oak----- Southern red oak----- Black oak----- Hickory----- Virginia pine----- Willow oak----- American elm-----	84 66 73 --- --- --- 73 --- --- --- --- ---	118 101 55 --- --- --- 55 --- --- --- ---	Loblolly pine, shortleaf pine.
HrB, HrC----- Herndon	8A	Slight	Slight	Slight	Slight	Slight	Loblolly pine----- Shortleaf pine----- White oak----- Southern red oak----- Yellow-poplar-----	81 66 68 68 ---	112 101 50 50 ---	Loblolly pine, shortleaf pine.
IrB, IrC----- Iredell	6C	Slight	Moderate	Slight	Slight	Moderate	Loblolly pine----- Shortleaf pine----- Post oak----- White oak-----	72 52 --- ---	96 72 --- ---	Loblolly pine, eastern redcedar.
LmB----- Lignum	9W	Slight	Slight	Moderate	Slight	Severe	Loblolly pine----- Shortleaf pine----- Northern red oak----- Virginia pine----- Southern red oak----- Red maple----- Yellow-poplar-----	89 67 --- --- 74 --- ---	129 103 --- --- 56 --- ---	Loblolly pine, eastern white pine.

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi- nation symbol <sup>1</sup>	Management concerns					Potential productivity			Trees to plant <sup>4</sup>
		Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Wind- throw hazard	Plant competi- tion	Common trees	Site index <sup>2</sup>	Volume <sup>3</sup>	
MaB----- Mayodan	9A	Slight	Slight	Slight	Slight	Moderate	Loblolly pine----- Shortleaf pine----- Virginia pine----- White oak----- Yellow-poplar----- Sweetgum----- Southern red oak----- Black oak----- Hickory-----	88 63 74 71 --- --- --- --- ---	127 95 114 53 --- --- --- --- ---	Loblolly pine, shortleaf pine.
NaB, NaC----- Nason	8A	Slight	Slight	Slight	Slight	Moderate	Loblolly pine----- Northern red oak----- Virginia pine----- Shortleaf pine-----	81 76 --- 60	112 58 --- 88	Loblolly pine, shortleaf pine.
NaE----- Nason	7R	Moderate	Moderate	Moderate	Slight	Slight	Loblolly pine----- Virginia pine----- Shortleaf pine----- Northern red oak-----	75 --- 56 72	101 --- 80 54	Loblolly pine.
NaF----- Nason	7R	Severe	Severe	Moderate	Slight	Slight	Loblolly pine----- Virginia pine----- Shortleaf pine----- Northern red oak-----	75 --- 56 72	101 --- 80 54	Loblolly pine.
PaE----- Pacolet	8R	Moderate	Moderate	Slight	Slight	Slight	Loblolly pine----- Shortleaf pine----- Yellow-poplar----- Virginia pine----- Northern red oak----- Hickory----- White oak-----	85 68 90 71 --- --- ---	120 106 90 110 --- --- ---	Loblolly pine, shortleaf pine.
PaF----- Pacolet	8R	Severe	Severe	Slight	Slight	Slight	Loblolly pine----- Shortleaf pine----- Yellow-poplar----- Virginia pine----- Northern red oak----- Hickory----- White oak-----	85 68 90 71 --- --- ---	120 106 90 110 --- --- ---	Loblolly pine, shortleaf pine.

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol <sup>1</sup>	Management concerns					Potential productivity			Trees to plant <sup>4</sup>
		Erosion hazard	Equipment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index <sup>2</sup>	Volume <sup>3</sup>	
PcA----- Picture	7W	Slight	Severe	Severe	Slight	Severe	Loblolly pine----- Shortleaf pine----- Willow oak----- Water oak----- Sweetgum----- Red maple----- Green ash----- Bitternut hickory--- American elm----- Sugarberry-----	71 --- 50 --- --- --- --- --- --- ---	95 --- 68 --- --- --- --- --- --- ---	Loblolly pine.
PnD----- Pinkston	3D	Moderate	Moderate	Severe	Moderate	Slight	Loblolly pine----- Southern red oak----- Virginia pine----- Shortleaf pine-----	--- --- --- ---	--- --- --- ---	Loblolly pine.
RwD <sup>5</sup> : Rion-----	8A	Slight	Slight	Slight	Slight	Slight	Loblolly pine----- Post oak----- Shortleaf pine----- Southern red oak----- Sweetgum----- White oak----- Yellow-poplar----- Hickory----- Northern red oak----	80 --- --- --- --- --- --- --- ---	110 --- --- --- --- --- --- --- ---	Loblolly pine, shortleaf pine.
Wateree-----	7A	Slight	Slight	Slight	Moderate	Slight	Loblolly pine----- Shortleaf pine----- Southern red oak----- Yellow-poplar----- Virginia pine----- White oak-----	77 --- --- --- --- ---	105 --- --- --- --- ---	Loblolly pine, shortleaf pine.
Wedowee-----	8A	Slight	Slight	Slight	Slight	Moderate	Loblolly pine----- Virginia pine----- Shortleaf pine----- Southern red oak----- Northern red oak----- White oak-----	87 --- 68 74 --- 74	125 --- 106 56 --- 56	Loblolly pine, shortleaf pine.

See footnotes at end of table.



TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol <sup>1</sup>	Management concerns					Potential productivity			Trees to plant <sup>4</sup>
		Erosion hazard	Equipment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index <sup>2</sup>	Volume <sup>3</sup>	
TaE----- Tatum	7R	Moderate	Moderate	Moderate	Slight	Moderate	Loblolly pine----- White oak----- Chestnut oak----- Virginia pine-----	75 --- --- ---	101 --- --- ---	Loblolly pine, shortleaf pine.
VaB, VaC----- Vance	7A	Slight	Moderate	Slight	Slight	Moderate	Loblolly pine----- Shortleaf pine----- White oak----- Northern red oak----- Hickory----- Virginia pine----- Yellow-poplar----- Southern red oak----- Sweetgum-----	73 53 58 67 --- --- --- --- ---	98 74 41 49 --- --- --- --- ---	Loblolly pine.
WaE <sup>5</sup> : Wateree-----	7R	Moderate	Moderate	Moderate	Moderate	Slight	Loblolly pine----- Shortleaf pine----- Southern red oak----- Yellow-poplar----- Virginia pine----- White oak-----	77 --- --- --- --- ---	105 --- --- --- --- ---	Loblolly pine, shortleaf pine.
Rion-----	8R	Moderate	Moderate	Slight	Slight	Slight	Loblolly pine----- Post oak----- Shortleaf pine----- Southern red oak----- Sweetgum----- White oak----- Yellow-poplar----- Hickory----- Northern red oak-----	80 --- --- --- --- --- --- --- ---	110 --- --- --- --- --- --- --- ---	Loblolly pine, shortleaf pine.
Wedowee-----	8R	Moderate	Moderate	Slight	Slight	Moderate	Loblolly pine----- Virginia pine----- Shortleaf pine----- Southern red oak----- Northern red oak----- White oak-----	87 68 68 74 --- 74	125 --- 106 56 --- 56	Loblolly pine, shortleaf pine.

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi- nation symbol <sup>1</sup>	Management concerns					Potential productivity			Trees to plant <sup>4</sup>
		Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Wind- throw hazard	Plant competi- tion	Common trees	Site index <sup>2</sup>	Volume <sup>3</sup>	
WeB, WeC----- Wedowee	8A	Slight	Slight	Slight	Slight	Moderate	Loblolly pine----- Virginia pine----- Shortleaf pine----- Southern red oak---- Northern red oak---- White oak-----	87 --- 68 74 --- 74	125 --- 106 56 --- 56	Loblolly pine, shortleaf pine.

<sup>1</sup> The number in the ordination symbol denotes potential productivity in cubic meters per hectare per year for a group (range) of site indices for the indicator species (first tree listed under common trees). One cubic meter per hectare per year equals 14.3 cubic feet per acre per year.

<sup>2</sup> Site indices were assigned using available plot data. Where sufficient plot data were not available, indices for some species were derived from a comparison curve (Olsen and Della-Bianca, USFS, SEFES Pap. 104). Where no data exists, site index was based on data from soils with similar properties. Eroded phases of soils were reduced by one productivity class. Site indices for Chewacla and Wehadkee soils were based on available data and SITEQAUL (Computerized Site Evaluation, USFS, Gen. Tech. Rep. SO-62, July 1986).

<sup>3</sup> Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands. Cubic feet can be converted to board feet by multiplying by about 5.

<sup>4</sup> If hardwoods are desired on a forest site, rely on natural reproduction (seeds and sprouts) of acceptable species. Special site preparation techniques may be required. Planting of hardwoods on a specific site should follow the recommendations of a forester.

<sup>5</sup> See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AaA----- Altavista	Severe: flooding.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
ApB----- Appling	Slight-----	Slight-----	Moderate: slope, small stones.	Slight-----	Slight.
ApC----- Appling	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight-----	Moderate: slope.
AuC*: Appling-----	Slight-----	Slight-----	Severe: slope.	Slight-----	Slight.
Urban land.					
CaB, CeB2----- Cecil	Slight-----	Slight-----	Moderate: slope, small stones.	Slight-----	Slight.
CeC2----- Cecil	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight-----	Moderate: slope.
ChA*: Chewacla-----	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Wehadkee-----	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
CoA----- Congaree	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
CrB----- Creedmoor	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Moderate: wetness.	Moderate: wetness.
CrC----- Creedmoor	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Moderate: wetness.	Moderate: wetness, slope.
EnB----- Enon	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight-----	Slight.
EnC----- Enon	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight-----	Moderate: slope.
GeB----- Georgeville	Slight-----	Slight-----	Moderate: slope.	Severe: erodes easily.	Slight.
GeC----- Georgeville	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
HeB----- Helena	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
HeC----- Helena	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: wetness, slope.
HrB----- Herndon	Slight-----	Slight-----	Moderate: slope.	Severe: erodes easily.	Slight.
HrC----- Herndon	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
IrB----- Iredell	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
IrC----- Iredell	Severe: wetness.	Moderate: slope, wetness.	Severe: slope, wetness.	Moderate: wetness.	Moderate: wetness, slope.
IuC*: Iredell-----	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Urban land.					
Picture-----	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
LmB----- Lignum	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
MaB----- Mayodan	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
NaB----- Nason	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight-----	Moderate: small stones, large stones.
NaC----- Nason	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight-----	Moderate: small stones, slope, large stones.
NaE----- Nason	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
NaF----- Nason	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
PaE----- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
PaF----- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PcA----- Picture	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
PnD----- Pinkston	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
RwD*: Rion-----	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight-----	Moderate: droughty, slope.
Wateree-----	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight-----	Moderate: slope, droughty, depth to rock.
Wedowee-----	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight-----	Moderate: slope.
TaE----- Tatum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Ud. Udorthents					
UrC*: Urban land.					
Iredell-----	Severe: wetness.	Moderate: wetness.	Severe: slope, wetness.	Moderate: wetness.	Moderate: wetness.
Creedmoor-----	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Moderate: wetness.	Moderate: wetness.
VaB----- Vance	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones.	Slight-----	Slight.
VaC----- Vance	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight-----	Moderate: slope.
WaE*: Wateree-----	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Rion-----	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Wedowee-----	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
WeB----- Wedowee	Slight-----	Slight-----	Moderate: slope, small stones.	Slight-----	Slight.
WeC----- Wedowee	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight-----	Moderate: slope.

\* See description of the map unit for composition and behavior characteristics of the map unit.



TABLE 8.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Conif- erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AaA----- Altavista	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
ApB----- Appling	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ApC----- Appling	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CaB----- Cecil	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CeB2----- Cecil	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CeC2----- Cecil	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
ChA*: Chewacla-----	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
Wehadkee-----	Very poor.	Poor	Poor	Fair	Fair	Good	Fair	Poor	Fair	Fair.
CoA----- Congaree	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
CrB----- Creedmoor	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CrC----- Creedmoor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
EnB----- Enon	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EnC----- Enon	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
GeB, GeC----- Georgeville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HeB----- Helena	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
HeC----- Helena	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HrB----- Herndon	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HrC----- Herndon	Fair	Good	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Conif- erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
IrB, IrC----- Iredell	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ImB----- Lignum	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MaB----- Mayodan	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
NaB----- Nason	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
NaC----- Nason	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
NaE----- Nason	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
NaF----- Nason	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
PaE----- Pacolet	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
PaF----- Pacolet	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
PcA----- Picture	Fair	Good	Fair	Fair	Fair	Fair	Poor	Fair	Fair	Fair.
PnD----- Pinkston	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
RwD*: Rion-----	Poor	Fair	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Wateree-----	Poor	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Wedowee-----	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
TaE----- Tatum	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Ud. Udorthents										
VaB----- Vance	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
VaC----- Vance	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WaE*: Wateree-----	Poor	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Conif- erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
WaE*: Rion-----	Poor	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Wedowee-----	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
WeB----- Wedowee	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WeC----- Wedowee	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

\* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AaA----- Altavista	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding, low strength.	Moderate: wetness.
ApB----- Appling	Moderate: too clayey.	Slight-----	Slight-----	Moderate: slope.	Moderate: low strength.	Slight.
ApC----- Appling	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
AuC*: Appling-----  Urban land.	Moderate: too clayey.	Slight-----	Slight-----	Moderate: slope.	Moderate: low strength.	Slight.
CaB, CeB2----- Cecil	Moderate: too clayey.	Slight-----	Slight-----	Moderate: slope.	Moderate: low strength.	Slight.
CeC2----- Cecil	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
ChA*: Chewacla-----	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
Wehadkee-----	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, low strength.	Severe: wetness, flooding.
CoA----- Congaree	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
CrB----- Creedmoor	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness.
CrC----- Creedmoor	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: wetness, slope.
EnB----- Enon	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
EnC----- Enon	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
GeB----- Georgeville	Moderate: too clayey.	Slight-----	Slight-----	Moderate: slope.	Moderate: low strength.	Slight.
GeC----- Georgeville	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
HeB----- Helena	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness.
HeC----- Helena	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: wetness, slope.
HrB----- Herndon	Moderate: too clayey.	Slight-----	Slight-----	Moderate: slope.	Moderate: low strength.	Slight.
HrC----- Herndon	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
IrB----- Iredell	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness.
IrC----- Iredell	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: wetness, slope.
IuC*: Iredell-----	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness.
Urban land.						
Picture-----	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness.
LmB----- Lignum	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness.
MaB----- Mayodan	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
NaB----- Nason	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength.	Moderate: small stones, large stones.
NaC----- Nason	Moderate: slope, too clayey.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: small stones, slope, large stones.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
NaE, NaF----- Nason	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
PaE----- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PaF----- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PcA----- Picture	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness.
PnD----- Pinkston	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
RwD*: Rion-----	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
Wateree-----	Severe: cutbanks cave.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope.	Moderate: slope, droughty, depth to rock.
Wedowee-----	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
TaE----- Tatum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
Ud. Udorthents						
UrC*: Urban land.						
Iredell-----	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness.
Creedmoor-----	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness.
VaB----- Vance	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
VaC----- Vance	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.

See footnote at end of table.



TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
WaE*: Wateree-----	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rion-----	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Wedowee-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
WeB----- Wedowee	Moderate: too clayey.	Slight-----	Slight-----	Moderate: slope.	Moderate: low strength.	Slight.
WeC----- Wedowee	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.

\* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AaA----- Altavista	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness, too clayey.
ApB----- Appling	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----	Fair: too clayey, hard to pack.
ApC----- Appling	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
AuC*: Appling-----	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----	Fair: too clayey, hard to pack.
Urban land.					
CaB, CeB2----- Cecil	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----	Fair: too clayey, hard to pack.
CeC2----- Cecil	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
ChA*: Chewacla-----	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack, wetness.
Wehadkee-----	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness, thin layer.
CoA----- Congaree	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
CrB----- Creedmoor	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
CrC----- Creedmoor	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness, too clayey.	Moderate: wetness, slope.	Poor: too clayey, hard to pack.
EnB----- Enon	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight-----	Poor: too clayey, hard to pack.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
EnC----- Enon	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
GeB----- Georgeville	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----	Fair: too clayey, hard to pack.
GeC----- Georgeville	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
HeB----- Helena	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
HeC----- Helena	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness, too clayey.	Moderate: wetness, slope.	Poor: too clayey, hard to pack.
HrB----- Herndon	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----	Fair: too clayey, hard to pack.
HrC----- Herndon	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
IrB----- Iredell	Severe: wetness, percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
IrC----- Iredell	Severe: wetness, percs slowly.	Severe: slope.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
IuC*: Iredell-----	Severe: wetness, percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Urban land.					
Picture-----	Severe: wetness, percs slowly.	Moderate: depth to rock.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
LmB----- Lignum	Severe: percs slowly, wetness.	Moderate: depth to rock, slope.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
MaB----- Mayodan	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight-----	Poor: too clayey, hard to pack.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
NaB----- Nason	Moderate: depth to rock, percs slowly.	Moderate: slope, seepage, depth to rock.	Severe: too clayey, depth to rock.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
NaC----- Nason	Moderate: slope, percs slowly, depth to rock.	Severe: slope.	Severe: too clayey, depth to rock.	Moderate: slope, depth to rock.	Poor: too clayey, hard to pack.
NaE, NaF----- Nason	Severe: slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: slope, too clayey, hard to pack.
PaE----- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
PaF----- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
PcA----- Picture	Severe: wetness, percs slowly.	Moderate: depth to rock.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
PnD----- Pinkston	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, small stones, slope.
RwD*: Rion-----	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too clayey, slope.
Wateree-----	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock.
Wedowee-----	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: small stones, slope.
TaE----- Tatum	Severe: slope.	Severe: slope.	Severe: slope, too clayey, depth to rock.	Severe: slope.	Poor: slope, too clayey, hard to pack.
Ud. Udorthents					
UrC*: Urban land.					
Iredell-----	Severe: wetness, percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
UrC*: Creedmoor-----	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
VaB----- Vance	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight-----	Poor: too clayey, hard to pack.
VaC----- Vance	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
WaE*: Wateree-----	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.
Rion-----	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
Wedowee-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
WeB----- Wedowee	Moderate: percs slowly.	Moderate: seepage, slope.	Slight-----	Slight-----	Fair: small stones.
WeC----- Wedowee	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: small stones, slope.

\* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AaA----- Altavista	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
ApB, ApC----- Appling	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
AuC*: Appling-----  Urban land.	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
CaB, CeB2, CeC2----- Cecil	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
ChA*: Chewacla-----	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Wehadkee-----	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
CoA----- Congaree	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
CrB, CrC----- Creedmoor	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
EnB, EnC----- Enon	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
GeB, GeC----- Georgeville	Good-----	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
HeB, HeC----- Helena	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
HrB, HrC----- Herndon	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
IrB, IrC----- Iredell	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
IuC*: Iredell-----	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.

See footnote at end of table.



TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
IuC*: Urban land.				
Picture-----	Poor: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, wetness.
ImB----- Lignum	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
MaB----- Mayodan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
NaB, NaC, NaE----- Nason	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
NaF----- Nason	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
PaE----- Pacolet	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
PaF----- Pacolet	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
PcA----- Picture	Poor: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, wetness.
PnD----- Pinkston	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
RwD*: Rion-----	Good-----	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
Wateree-----	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Wedowee-----	Good-----	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
TaE----- Tatum	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Ud. Udorthents				
UrC*: Urban land.				
Iredell-----	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
Creedmoor-----	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
VaB, VaC----- Vance	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
WaE*: Wateree-----	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Rion-----	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Wedowee-----	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
WeB, WeC----- Wedowee	Good-----	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

\* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "moderate" and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
AaA----- Altavista	Moderate: seepage.	Severe: piping, wetness.	Favorable-----	Wetness-----	Wetness, soil blowing.	Favorable.
ApB----- Appling	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope-----	Soil blowing---	Favorable.
ApC----- Appling	Severe: slope.	Severe: hard to pack.	Deep to water	Slope-----	Slope, soil blowing.	Slope.
AuC*: Appling-----	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope-----	Soil blowing---	Favorable.
Urban land.						
CaB----- Cecil	Moderate: seepage, slope.	Severe: piping, hard to pack.	Deep to water	Slope, soil blowing.	Soil blowing---	Favorable.
CeB2----- Cecil	Moderate: seepage, slope.	Severe: piping, hard to pack.	Deep to water	Slope-----	Favorable-----	Favorable.
CeC2----- Cecil	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope-----	Slope-----	Slope.
ChA*: Chewacla-----	Moderate: seepage.	Severe: piping, hard to pack, wetness.	Flooding-----	Wetness, flooding.	Wetness-----	Wetness.
Wehadkee-----	Moderate: seepage.	Severe: wetness, piping.	Flooding-----	Wetness, soil blowing, flooding.	Wetness, soil blowing.	Wetness.
CoA----- Congaree	Moderate: seepage.	Severe: piping.	Flooding-----	Wetness-----	Erodes easily, wetness.	Erodes easily.
CrB----- Creedmoor	Moderate: slope.	Severe: hard to pack.	Percs slowly, slope.	Slope, wetness, soil blowing.	Wetness, soil blowing.	Rooting depth, percs slowly.
CrC----- Creedmoor	Severe: slope.	Severe: hard to pack.	Percs slowly, slope.	Slope, wetness, fast intake.	Slope, wetness, soil blowing.	Slope, rooting depth, percs slowly.
EnB----- Enon	Moderate: slope.	Severe: hard to pack.	Deep to water	Percs slowly, slope.	Percs slowly---	Percs slowly.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
EnC----- Enon	Severe: slope.	Severe: hard to pack.	Deep to water	Percs slowly, slope.	Slope, percs slowly.	Slope, percs slowly.
GeB----- Georgeville	Moderate: slope, seepage.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
GeC----- Georgeville	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
HeB----- Helena	Moderate: slope.	Severe: hard to pack.	Percs slowly, slope.	Slope, wetness, percs slowly.	Wetness, percs slowly.	Percs slowly.
HeC----- Helena	Severe: slope.	Severe: hard to pack.	Percs slowly, slope.	Slope, wetness, percs slowly.	Slope, wetness, percs slowly.	Slope, percs slowly.
HrB----- Herndon	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
HrC----- Herndon	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
IrB----- Iredell	Moderate: depth to rock, slope.	Severe: hard to pack.	Percs slowly, slope.	Slope, wetness.	Wetness-----	Wetness, percs slowly.
IrC----- Iredell	Severe: slope.	Severe: hard to pack.	Percs slowly, slope.	Slope, wetness.	Slope, wetness.	Wetness, slope, percs slowly.
IuC*: Iredell-----	Moderate: depth to rock, slope.	Severe: hard to pack.	Percs slowly, slope.	Slope, wetness.	Wetness-----	Wetness, percs slowly.
Urban land.						
Picture-----	Moderate: depth to rock.	Severe: hard to pack, wetness.	Percs slowly---	Wetness, soil blowing, percs slowly.	Wetness, soil blowing, percs slowly.	Wetness, percs slowly.
LmB----- Lignum	Moderate: depth to rock, slope.	Moderate: thin layer, hard to pack, wetness.	Slope, percs slowly.	Wetness, percs slowly, slope.	Erodes easily, wetness.	Wetness, erodes easily.
MaB----- Mayodan	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope, soil blowing.	Soil blowing---	Favorable.
NaB----- Nason	Moderate: seepage, depth to rock, slope.	Severe: thin layer.	Deep to water	Slope-----	Favorable-----	Favorable.
NaC, NaE, NaF----- Nason	Severe: slope.	Severe: thin layer.	Deep to water	Slope-----	Slope-----	Slope.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
PaE----- Pacolet	Severe: slope.	Severe: piping.	Deep to water	Slope-----	Slope, soil blowing.	Slope.
PaF----- Pacolet	Severe: slope.	Severe: piping.	Deep to water	Slope-----	Slope, soil blowing.	Slope.
PcA----- Picture	Moderate: depth to rock.	Severe: hard to pack, wetness.	Percs slowly---	Wetness, soil blowing, percs slowly.	Wetness, soil blowing, percs slowly.	Wetness, percs slowly.
PnD----- Pinkston	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, droughty.	Slope, depth to rock.	Slope, droughty.
RwD*: Rion-----	Severe: seepage, slope.	Severe: piping.	Deep to water	Droughty, slope.	Soil blowing, slope.	Slope, droughty.
Wateree-----	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, droughty.	Slope, depth to rock, soil blowing.	Slope, droughty, depth to rock.
Wedowee-----	Severe: slope.	Severe: piping.	Deep to water	Slope-----	Slope-----	Slope.
TaE----- Tatum	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Ud. Udorthents						
UrC*: Urban land.						
Iredell-----	Moderate: depth to rock, slope.	Severe: hard to pack.	Percs slowly, slope.	Slope, wetness.	Wetness-----	Wetness, percs slowly.
Creedmoor-----	Moderate: slope.	Severe: hard to pack.	Percs slowly, slope.	Slope, wetness, fast intake.	Wetness, soil blowing.	Rooting depth, percs slowly.
VaB----- Vance	Moderate: slope.	Severe: hard to pack.	Deep to water	Slope, percs slowly, soil blowing.	Percs slowly---	Percs slowly.
VaC----- Vance	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, percs slowly, soil blowing.	Slope, percs slowly.	Slope, percs slowly.
WaE*: Wateree-----	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, droughty.	Slope, depth to rock, soil blowing.	Slope, droughty, depth to rock.
Rion-----	Severe: seepage, slope.	Severe: piping.	Deep to water	Droughty, slope.	Soil blowing, slope.	Slope, droughty.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
WaE*: Wedowee-----	Severe: slope.	Severe: piping.	Deep to water	Slope-----	Slope-----	Slope.
WeB----- Wedowee	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope-----	Favorable-----	Favorable.
WeC----- Wedowee	Severe: slope.	Severe: piping.	Deep to water	Slope-----	Slope-----	Slope.

\* See description of the map unit for composition and behavior characteristics of the map unit.



TABLE 13.--ENGINEERING INDEX PROPERTIES

(The symbol &lt; means less than; &gt; means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
AaA----- Altavista	0-20	Loam, sandy loam	ML, CL-ML, SM, SC-SM	A-4	0	95-100	90-100	65-99	35-60	<23	NP-7
	20-57	Clay loam, sandy clay loam, loam.	CL, CL-ML, SC, SC-SM	A-4, A-6, A-7	0	95-100	95-100	60-99	45-75	20-45	5-28
	57-72	Variable-----	---	---	---	---	---	---	---	---	---
ApB----- Appling	0-11	Sandy loam-----	SM, SC-SM	A-2	0-5	86-100	80-100	55-91	15-35	<35	NP-7
	11-35	Sandy clay, clay loam, clay.	MH, ML, CL	A-7	0-5	95-100	90-100	70-95	51-80	41-74	15-30
	35-65	Sandy clay, clay loam, sandy clay loam.	SC, CL	A-4, A-6, A-7	0-5	95-100	85-100	70-90	40-75	25-45	8-22
ApC----- Appling	0-9	Sandy loam-----	SM, SC-SM	A-2	0-5	86-100	80-100	55-91	15-35	<35	NP-7
	9-44	Sandy clay, clay loam, sandy clay loam.	SC, CL	A-4, A-6, A-7	0-5	95-100	85-100	70-90	40-75	25-45	8-22
	44-72	Variable-----	---	---	---	---	---	---	---	---	---
AuC*: Appling-----	0-12	Sandy loam-----	SM, SC-SM	A-2	0-5	86-100	80-100	55-91	15-35	<35	NP-7
	12-48	Sandy clay, clay loam, clay.	MH, ML, CL	A-7	0-5	95-100	90-100	70-95	51-80	41-74	15-30
	48-55	Sandy clay, clay loam, sandy clay loam.	SC, CL	A-4, A-6, A-7	0-5	95-100	85-100	70-90	40-75	25-45	8-22
	55-65	Variable-----	---	---	---	---	---	---	---	---	---
Urban land.											
CaB----- Cecil	0-8	Sandy loam-----	SM, SC-SM	A-2, A-4	0-5	84-100	80-100	67-90	26-42	<30	NP-7
	8-55	Clay, clay loam	MH, ML, CH	A-7, A-5	0-5	97-100	92-100	72-100	55-95	41-80	9-37
	55-65	Variable-----	---	---	---	---	---	---	---	---	---
CeB2----- Cecil	0-8	Clay loam-----	SM, SC, CL, ML	A-4, A-6	0-5	75-100	75-100	68-95	38-81	21-35	3-17
	8-58	Clay, clay loam	MH, ML, CH	A-7, A-5	0-5	97-100	92-100	72-100	55-95	41-80	9-37
	58-65	Variable-----	---	---	---	---	---	---	---	---	---
CeC2----- Cecil	0-2	Clay loam-----	SM, SC, CL, ML	A-4, A-6	0-5	75-100	75-100	68-95	38-81	21-35	3-17
	2-7	Sandy clay loam, clay loam.	SM, SC, ML, CL	A-4, A-6	0-5	75-100	75-100	68-95	38-81	21-35	3-17
	7-55	Clay, clay loam	MH, ML, CH	A-7, A-5	0-5	97-100	92-100	72-100	55-95	41-80	9-37
	55-65	Variable-----	---	---	---	---	---	---	---	---	---
ChA*: Chewacla-----	0-6	Loam-----	ML, CL, CL-ML	A-4, A-6, A-7	0	98-100	95-100	70-90	55-75	25-49	4-20
	6-19	Sandy clay loam, loam, sandy loam.	SM, SC-SM, ML, CL	A-4, A-7-6, A-6	0	96-100	95-100	60-100	36-70	20-45	2-15
	19-65	Variable-----	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
ChA*: Wehadkee-----	0-14	Loam, silt loam	SM, SC, SC-SM	A-2, A-4	0	100	95-100	60-90	30-50	<30	NP-10
	14-42	Loam, sandy clay loam, fine sandy loam.	CL, CL-ML, ML, SC	A-6, A-7, A-4	0	100	95-100	85-100	45-95	20-58	6-25
	42-72	Variable-----	---	---	---	---	---	---	---	---	---
CoA----- Congaree	0-12	Silt loam-----	CL-ML, ML, CL	A-4	0	95-100	95-100	70-100	51-90	20-35	> 3
	12-80	Silt loam, fine sandy loam, loam, sandy loam.	SC, ML, CL, SM	A-4, A-6, A-7	0	95-100	95-100	70-100	40-90	25-50	3-22
CrB----- Creedmoor	0-7	Coarse sandy loam	SM, SC-SM	A-2	0-3	98-100	95-100	50-75	15-35	<5	NP-5
	7-68	Clay, silty clay, silty clay loam.	CH	A-7	0-3	98-100	95-100	85-97	70-95	51-79	25-49
	68-83	Sandy loam, sandy clay loam, silty clay loam.	ML, CL-ML, SM, SC	A-7, A-6, A-4	0-5	98-100	95-100	85-98	45-90	25-49	4-21
CrC----- Creedmoor	0-15	Coarse sandy loam, sandy loam.	SM, SC-SM	A-2	0-3	98-100	95-100	50-75	15-40	<30	NP-5
	15-35	Clay, silty clay, sandy clay.	CH	A-7	0-3	98-100	95-100	85-97	70-95	51-79	25-49
	35-65	Sandy loam, sandy clay loam, silty clay loam.	ML, CL-ML, SM, SC	A-7, A-6, A-4	0-5	98-100	95-100	85-98	45-90	25-49	4-21
EnB----- Enon	0-5	Loam-----	ML, CL-ML, CL	A-4, A-6	0-5	95-100	90-100	75-95	51-80	20-40	3-20
	5-48	Clay loam, clay	CH, CL	A-7-6	0-5	85-100	80-100	75-98	65-95	40-90	25-65
	48-65	Variable-----	---	---	---	---	---	---	---	---	---
EnC----- Enon	0-5	Loam-----	ML, CL-ML, CL	A-4, A-6	0-5	95-100	90-100	75-95	51-80	20-40	3-20
	5-25	Clay loam, clay	CH, CL	A-7-6	0-5	85-100	80-100	75-98	65-95	40-90	25-65
	25-65	Variable-----	---	---	---	---	---	---	---	---	---
GeB----- Georgeville	0-8	Silt loam-----	CL, ML	A-6, A-7, A-4	0-2	90-100	90-100	85-100	65-98	24-49	3-20
	8-62	Clay, silty clay, clay loam.	MH, ML	A-7	0-1	95-100	95-100	90-100	75-98	41-85	15-45
	62-72	Sandy loam, loam, silt loam.	ML, CL, CL-ML	A-4, A-6	0-5	90-100	90-100	65-100	51-95	<30	NP-12
GeC----- Georgeville	0-5	Silt loam-----	CL, ML	A-6, A-7, A-4	0-2	90-100	90-100	85-100	65-98	24-49	3-20
	5-35	Clay, silty clay, silty clay loam.	MH, ML	A-7	0-1	95-100	95-100	90-100	75-98	41-85	15-45
	35-65	Clay loam, loam, silt loam.	ML, CL, CL-ML	A-4, A-6	0-5	90-100	90-100	65-100	51-95	<30	NP-12

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
HeB----- Helena	0-12	Sandy loam-----	SM, SC-SM, SC, ML	A-2, A-4	0-5	90-100	90-100	51-95	26-75	<35	NP-10
	12-19	Sandy clay loam, clay loam.	CL, SC	A-6, A-7	0-5	95-100	95-100	70-90	38-70	30-49	15-26
	19-50	Clay loam, sandy clay, clay.	CH	A-7	0-5	95-100	95-100	73-97	56-86	50-85	24-50
	50-72	Variable-----	---	---	---	---	---	---	---	---	---
HeC----- Helena	0-11	Sandy loam, fine sandy loam.	SM, SC-SM, SC, ML	A-2, A-4	0-5	90-100	90-100	51-95	26-75	<35	NP-10
	11-26	Sandy clay loam, clay loam.	CL, SC	A-6, A-7	0-5	95-100	95-100	70-90	38-70	30-49	15-26
	26-44	Clay loam, sandy clay, clay.	CH	A-7	0-5	95-100	95-100	73-97	56-86	50-85	24-50
	44-65	Variable-----	---	---	---	---	---	---	---	---	---
HrB----- Herndon	0-8	Silt loam-----	ML, CL, CL-ML	A-4, A-6	0-2	90-100	85-100	80-98	60-90	<36	NP-12
	8-40	Clay loam, silty clay loam, clay.	MH, ML, CL	A-7	0-1	98-100	90-100	80-99	70-98	41-70	13-40
	40-65	Silt loam, loam, fine sandy loam.	MH, ML	A-7, A-5	0-2	90-100	85-100	80-99	51-95	41-70	9-36
HrC----- Herndon	0-10	Silt loam-----	ML, CL, CL-ML	A-4, A-6	0-2	90-100	85-100	80-98	60-90	<36	NP-12
	10-55	Clay loam, silty clay loam, clay.	MH, ML, CL	A-7	0-1	98-100	90-100	80-99	70-98	41-70	13-40
	55-65	Silt loam, loam, fine sandy loam.	MH, ML	A-7, A-5	0-2	90-100	85-100	80-99	51-95	41-70	9-36
IrB----- Iredell	0-10	Loam-----	ML, CL-ML, CL	A-4, A-6	0-1	99-100	95-100	80-95	51-70	25-38	5-12
	10-24	Clay-----	CH	A-7	0	99-100	60-100	60-100	55-95	54-115	29-85
	24-53	Loam, clay loam, sandy loam.	CL, CL-ML	A-4, A-6	0-1	98-100	85-100	70-95	40-75	30-50	10-30
	53-65	Weathered bedrock	---	---	---	---	---	---	---	---	---
IrC----- Iredell	0-5	Loam-----	ML, CL-ML, CL	A-4, A-6	0-1	99-100	95-100	80-95	51-70	25-38	5-12
	5-40	Clay, clay loam	CH	A-7	0	99-100	60-100	60-100	55-95	54-115	29-85
	40-49	Loam, sandy clay loam, sandy loam.	CL, CL-ML	A-4, A-6	0-1	98-100	85-100	70-95	40-75	30-50	10-30
	49-62	Weathered bedrock	---	---	---	---	---	---	---	---	---
IuC*: Iredell-----	0-10	Loam-----	ML, CL-ML, CL	A-4, A-6	0-1	99-100	95-100	80-95	51-70	25-38	5-12
	10-24	Clay-----	CH	A-7	0	99-100	60-100	60-100	55-95	54-115	29-85
	24-53	Loam, clay loam, sandy loam.	CL, CL-ML	A-4, A-6	0-1	98-100	85-100	70-95	40-75	30-50	10-30
	53-65	Weathered bedrock	---	---	---	---	---	---	---	---	---
Urban land.											

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
IuC*: Picture-----	0-7	Loam-----	CL-ML, CL, ML, SC	A-4, A-6, A-7	0-1	80-100	75-100	55-90	45-75	20-50	5-20
	7-31	Clay, clay loam, sandy clay.	CH	A-7	0-1	80-100	75-100	60-95	50-90	50-85	30-60
	31-49	Clay loam, sandy clay loam, sandy loam.	SC, CL, CL-ML	A-2, A-4, A-6, A-7-6	0-1	80-100	75-100	50-85	30-70	25-45	5-25
	49-62	Weathered bedrock	---	---	---	---	---	---	---	---	---
ImB----- Lignum	0-14	Silt loam-----	CL, CL-ML	A-4, A-6	0	95-100	80-100	80-100	55-90	20-35	5-19
	14-34	Silty clay loam, silty clay, clay.	CH, CL	A-7	0-5	80-100	75-100	70-100	55-90	45-70	22-45
	34-39	Silt loam-----	CL, CL-ML	A-4, A-6, A-7	0	95-100	80-100	80-100	55-90	20-35	5-19
	39-46	Sandy clay loam, gravelly sandy clay loam, gravelly silty clay loam.	SC, CL, ML, SM	A-4, A-6, A-7, A-2	0-15	70-85	35-80	30-80	20-75	30-50	8-18
	46-62	Weathered bedrock	---	---	---	---	---	---	---	---	---
MaB----- Mayodan	0-9	Sandy loam-----	SM, ML	A-2, A-4	0-5	92-100	80-100	49-98	30-70	<36	NP-8
	9-28	Silty clay loam, clay loam, sandy clay loam.	CL	A-4, A-6, A-7-6	0-2	95-100	95-100	90-100	50-98	25-50	7-26
	28-44	Clay, sandy clay, clay loam.	MH, CH, CL, ML	A-7	0-2	95-100	90-100	80-100	50-98	41-80	15-45
	44-65	Variable-----	---	---	---	---	---	---	---	---	---
	65-75	Weathered bedrock	---	---	---	---	---	---	---	---	---
NaB----- Nason	0-12	Gravelly loam, loam.	SM, GM, ML	A-1, A-2, A-4	0-10	65-85	55-75	40-75	20-70	<38	NP-10
	12-37	Clay loam, clay, gravelly silty clay loam.	CL, CH	A-7	0-5	80-100	75-100	70-95	65-90	40-60	15-30
	37-42	Gravelly silt loam, silt loam, silty clay loam.	CL, CL-ML, SC, GC	A-2, A-4, A-6	0-5	60-80	50-75	40-75	30-70	20-35	4-12
	42-50	Weathered bedrock	---	---	---	---	---	---	---	---	---
NaC----- Nason	0-11	Gravelly loam, gravelly silt loam.	SM, GM, ML	A-1, A-2, A-4	0-10	65-85	55-75	40-75	20-70	<38	NP-10
	11-31	Silty clay loam, silty clay, clay.	CL, CH	A-7	0-5	80-100	75-100	70-95	65-90	40-60	15-30
	31-52	Gravelly silt loam, silt loam, silty clay loam.	CL, CL-ML, SC, GC	A-2, A-4, A-6	0-5	60-80	50-75	40-75	30-70	20-35	4-12
	52-62	Weathered bedrock	---	---	---	---	---	---	---	---	---
NaE----- Nason	0-11	Gravelly loam, loam.	SM, GM, ML	A-1, A-2, A-4	0-10	65-85	55-75	40-75	20-70	<38	NP-10
	11-40	Clay loam, silty clay loam, clay.	CL, CH	A-7	0-5	80-100	75-100	70-95	65-90	40-60	15-30
	40-62	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
NaF----- Nason	0-5	Gravelly loam----	SM, GM, ML	A-1, A-2, A-4	0-10	65-85	55-75	40-75	20-70	<38	NP-10
	5-32	Clay loam, silty clay loam, clay.	CL, CH	A-7	0-5	80-100	75-100	70-95	65-90	40-60	15-30
	32-40	Gravelly silt loam, silt loam, silty clay loam.	CL, CL-ML, SC, GC	A-2, A-4, A-6	0-5	60-80	50-75	40-75	30-70	20-35	4-12
	40-62	Weathered bedrock	---	---	---	---	---	---	---	---	---
PaE----- Pacolet	0-8	Sandy loam-----	SM, SC-SM	A-2, A-1-b, A-4	0-2	85-100	80-100	42-90	16-42	<28	NP-7
	8-25	Sandy clay, clay loam, clay.	ML, MH, CL	A-6, A-7	0-1	80-100	80-100	60-100	51-75	38-65	11-33
	25-40	Clay loam, sandy clay loam, sandy loam.	CL, CL-ML, SC-SM, SC	A-2, A-4, A-6	0-2	80-100	70-100	60-80	30-60	20-35	5-15
	40-65	Sandy loam, fine sandy loam, loam.	SM, SC-SM	A-4, A-2-4	0-2	80-100	70-100	60-90	25-50	<28	NP-6
PaF----- Pacolet	0-10	Sandy loam-----	SM, SC-SM	A-2, A-1-b, A-4	0-2	85-100	80-100	42-90	16-42	<28	NP-7
	10-26	Sandy clay, clay loam, clay.	ML, MH, CL	A-6, A-7	0-1	80-100	80-100	60-100	51-75	38-65	11-33
	26-34	Clay loam, sandy clay loam, loam.	CL, CL-ML, SC-SM, SC	A-2, A-4, A-6	0-2	80-100	70-100	60-80	30-60	20-35	5-15
	34-65	Sandy loam, fine sandy loam, loam.	SM, SC-SM	A-4, A-2-4	0-2	80-100	70-100	60-90	25-50	<28	NP-6
PcA----- Picture	0-7	Loam-----	CL-ML, CL, ML, SC	A-4, A-6, A-7	0-1	80-100	75-100	55-90	45-75	20-50	5-20
	7-31	Clay, clay loam, sandy clay.	CH	A-7	0-1	80-100	75-100	60-95	50-90	50-85	30-60
	31-49	Clay loam, sandy clay loam, sandy loam.	SC, CL, CL-ML	A-2, A-4, A-6, A-7-6	0-1	80-100	75-100	50-85	30-70	25-45	5-25
	49-62	Weathered bedrock	---	---	---	---	---	---	---	---	---
PnD----- Pinkston	0-6	Loamy sand-----	CL, ML, SM, SC	A-2	0-5	80-100	75-100	45-75	25-30	<30	NP-10
	6-24	Loam, sandy loam, gravelly silt loam.	SC, CL, ML, SM	A-2, A-4, A-1	0-10	70-100	55-100	35-95	20-75	<30	NP-10
	24-32	Gravelly sandy loam, loam, sandy loam.	CL, GM, GP-GM, ML	A-1, A-2, A-4, A-6	0-10	40-100	35-85	20-80	10-60	16-35	3-15
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
RwD*: Rion-----	0-16	Sandy loam-----	SM	A-2, A-4	0-2	90-100	75-100	60-80	20-45	<35	NP-7
	16-34	Sandy loam, sandy clay loam, clay loam.	SC, SC-SM, CL-ML, CL	A-2, A-4, A-6	0-2	90-100	85-100	60-85	30-60	20-35	5-15
	34-65	Sandy loam, sandy clay loam, loamy sand.	SC, SM, SC-SM	A-2, A-4, A-6	0-2	90-100	80-100	60-85	15-50	<36	NP-12

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
RwD*:											
Wateree-----	0-3	Sandy loam-----	SM	A-2	0-5	80-100	75-95	45-80	25-35	<30	NP-7
	3-25	Sandy loam-----	SM	A-2, A-4	0-5	85-100	75-98	50-80	25-40	<30	NP-7
	25-39	Sand, loamy sand, sandy loam.	SP-SM, SM	A-1, A-2, A-3	0-5	70-100	65-98	40-80	5-35	<25	NP-3
	39-50	Weathered bedrock	---	---	---	---	---	---	---	---	---
Wedowee-----	50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
	0-10	Sandy loam-----	SM, SC-SM	A-4, A-2-4	0	95-100	80-100	50-99	23-50	<30	NP-6
	10-35	Sandy clay, clay loam, clay.	SC, ML, CL, MH	A-6, A-7	0	95-100	95-100	65-97	45-75	28-58	5-30
	35-62	Sandy clay loam, clay loam, sandy loam.	SC, SC-SM, CL, CL-ML	A-2, A-4, A-6	0	80-100	70-100	60-80	30-60	20-54	5-25
TaE----- Tatum	0-5	Loam-----	ML, CL, CL-ML	A-4, A-6	0-5	85-100	80-100	65-100	60-90	20-34	5-15
	5-58	Silty clay loam, silty clay, clay.	MH, CH	A-7	0-5	75-100	75-95	60-95	55-95	50-80	20-45
	58-70	Weathered bedrock	---	---	---	---	---	---	---	---	---
Ud.											
Udorthents											
UrC*:											
Urban land.											
Iredell-----	0-5	Loam-----	ML, CL-ML, CL	A-4, A-6	0-1	99-100	95-100	80-95	51-70	25-38	5-12
	5-26	Clay-----	CH	A-7	0	99-100	60-100	60-100	55-95	54-115	29-85
	26-55	Clay loam, loam	CL, CL-ML	A-4, A-6	0-1	95-100	85-100	70-95	40-75	30-50	10-30
	55-65	Weathered bedrock	---	---	---	---	---	---	---	---	---
Creedmoor-----	0-8	Coarse sandy loam	SM, SC-SM	A-2	0-3	98-100	95-100	50-75	15-35	<5	NP-5
	8-12	Sandy clay loam, clay loam, silty clay loam.	CL	A-7, A-6	0-3	98-100	95-100	85-95	60-80	35-50	20-30
	12-48	Clay, silty clay, silty clay loam.	CH	A-7	0-3	98-100	95-100	85-97	70-95	51-79	25-49
	48-68	Loam, sandy clay loam, silty clay loam.	ML, CL-ML, SM, SC	A-7, A-6, A-4	0-5	98-100	95-100	85-98	45-90	25-49	4-21
VaB----- Vance	0-9	Sandy loam-----	SM, SC-SM	A-2, A-4	0-5	90-100	80-100	55-80	15-40	<27	NP-7
	9-60	Clay loam, sandy clay, clay.	CH	A-7	0-5	95-100	90-100	75-95	65-80	51-80	25-48
	60-80	Variable-----	---	---	---	---	---	---	---	---	---
VaC----- Vance	0-4	Sandy loam-----	SM, SC-SM	A-2, A-4	0-5	90-100	80-100	55-80	15-40	<27	NP-7
	4-48	Clay loam, sandy clay, clay.	CH	A-7	0-5	95-100	90-100	75-95	65-80	51-80	25-48
	48-62	Variable-----	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
WaE*: Wateree-----	0-4	Sandy loam-----	SM	A-2	0-5	80-100	75-95	45-80	25-35	<30	NP-7
	4-21	Sandy loam-----	SM	A-2, A-4	0-5	85-100	75-98	50-80	25-40	<30	NP-7
	21-37	Loamy sand, sandy loam, coarse sandy loam.	SP-SM, SM	A-1, A-2, A-3	0-5	70-100	65-98	40-80	5-35	<25	NP-3
	37-62	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rion-----	0-20	Sandy loam-----	SM	A-2, A-4	0-2	90-100	85-100	60-80	20-45	<35	NP-7
	20-55	Sandy loam, sandy clay loam, clay loam.	SC, SC-SM, CL-ML, CL	A-2, A-4, A-6	0-2	90-100	85-100	60-85	30-60	20-35	5-15
	55-72	Sandy loam, coarse sandy loam, loamy sand.	SC, SM, SC-SM	A-2, A-4, A-6	0-2	90-100	80-100	60-85	15-50	<36	NP-12
	72-74	Weathered bedrock	---	---	---	---	---	---	---	---	---
Wedowee-----	0-12	Sandy loam-----	SM, SC-SM	A-4, A-2-4	0	95-100	80-100	50-99	23-50	<30	NP-6
	12-35	Sandy clay, clay loam, clay.	SC, ML, CL, MH	A-6, A-7	0	95-100	95-100	65-97	45-75	28-58	5-30
	35-65	Sandy clay loam, clay loam, sandy loam.	SC, SC-SM, CL, CL-ML	A-2, A-4, A-6	0	80-100	70-100	60-80	30-60	20-54	5-25
WeB----- Wedowee	0-7	Sandy loam, coarse sandy loam.	SM, SC-SM	A-4, A-2-4	0	95-100	80-100	50-99	23-50	<30	NP-6
	7-23	Sandy clay, clay loam, clay.	SC, ML, CL, MH	A-6, A-7	0	95-100	95-100	65-97	45-75	28-58	5-30
	23-65	Sandy clay loam, clay loam, sandy loam.	SC, SC-SM, CL, CL-ML	A-2, A-4, A-6	0	80-100	70-100	60-80	30-60	20-54	5-25
WeC----- Wedowee	0-12	Sandy loam-----	SM, SC-SM	A-4, A-2-4	0	95-100	80-100	50-99	23-50	<30	NP-6
	12-20	Sandy clay, clay loam, clay.	SC, ML, CL, MH	A-6, A-7	0	95-100	95-100	65-97	45-75	28-58	5-30
	20-65	Sandy clay loam, clay loam, sandy loam.	SC, SC-SM, CL, CL-ML	A-2, A-4, A-6	0	80-100	70-100	60-80	30-60	20-54	5-25

\* See description of the map unit for composition and behavior characteristics of the map unit.



TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction pH	Shrink-swell potential	Erosion factors		Organic matter
	In	Pct	g/cc	In/hr	In/in			K	T	Pct
AaA----- Altavista	0-20	10-27	1.30-1.50	2.0-6.0	0.12-0.20	3.6-6.5	Low-----	0.24	5	.5-3
	20-57	18-35	1.30-1.50	0.6-2.0	0.12-0.20	3.6-6.0	Low-----	0.24		
	57-72	---	---	---	---	---	-----	---		
ApB----- Appling	0-11	5-20	1.40-1.65	2.0-6.0	0.10-0.15	4.5-6.5	Low-----	0.24	4	.5-2
	11-35	35-60	1.25-1.45	0.6-2.0	0.15-0.17	4.5-5.5	Low-----	0.28		
	35-65	20-50	1.25-1.45	0.6-2.0	0.12-0.16	4.5-5.5	Low-----	0.28		
ApC----- Appling	0-9	5-20	1.40-1.65	2.0-6.0	0.10-0.15	4.5-6.5	Low-----	0.24	4	.5-2
	9-44	35-50	1.25-1.45	0.6-2.0	0.12-0.16	4.5-5.5	Low-----	0.28		
	44-72	---	---	---	---	---	-----	---		
AuC*: Appling-----	0-12	5-20	1.40-1.65	2.0-6.0	0.10-0.15	4.5-6.5	Low-----	0.24	4	.5-2
	12-48	35-60	1.25-1.45	0.6-2.0	0.15-0.17	4.5-5.5	Low-----	0.28		
	48-55	20-50	1.25-1.45	0.6-2.0	0.12-0.16	4.5-5.5	Low-----	0.28		
	55-65	---	---	---	---	---	-----	---		
Urban land.										
CaB----- Cecil	0-8	5-20	1.30-1.50	2.0-6.0	0.12-0.14	4.5-6.5	Low-----	0.28	4	.5-1
	8-55	35-70	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low-----	0.28		
	55-65	---	---	---	---	---	-----	---		
CeB2----- Cecil	0-8	27-40	1.30-1.50	0.6-2.0	0.13-0.15	4.5-6.5	Low-----	0.28	3	.5-1
	8-58	35-70	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low-----	0.28		
	58-65	---	---	---	---	---	-----	---		
CeC2----- Cecil	0-2	27-40	1.30-1.50	0.6-2.0	0.13-0.15	4.5-6.5	Low-----	0.28	3	.5-1
	2-7	27-40	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low-----	0.28		
	7-55	35-70	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low-----	0.28		
	55-65	---	---	---	---	---	-----	---		
ChA*: Chewacla-----	0-6	10-27	1.30-1.60	0.6-2.0	0.15-0.24	4.5-6.5	Low-----	0.28	5	1-4
	6-19	18-35	1.30-1.60	0.6-2.0	0.12-0.20	4.5-7.8	Low-----	0.28		
	19-65	---	---	---	---	---	-----	---		
Wehadkee-----	0-14	10-27	1.35-1.60	2.0-6.0	0.10-0.15	4.5-6.5	Low-----	0.24	5	2-5
	14-42	18-35	1.30-1.50	0.6-2.0	0.16-0.20	4.5-6.5	Low-----	0.32		
	42-72	---	---	---	---	---	-----	---		
CoA----- Congaree	0-12	12-27	1.20-1.40	0.6-2.0	0.12-0.20	4.5-7.3	Low-----	0.37	5	1-4
	12-80	18-27	1.20-1.50	0.6-2.0	0.12-0.20	4.5-7.3	Low-----	0.37		
CrB----- Creedmoor	0-7	5-20	1.60-1.75	6.0-20	0.05-0.10	3.6-5.5	Low-----	0.20	3	.5-2
	7-68	35-60	1.30-1.50	<0.06	0.13-0.15	3.6-5.5	High-----	0.32		
	68-83	5-35	1.60-1.95	<0.06	0.10-0.14	3.6-5.5	Low-----	0.37		
CrC----- Creedmoor	0-15	5-20	1.60-1.75	6.0-20	0.05-0.10	3.6-5.5	Low-----	0.20	3	.5-2
	15-35	35-60	1.30-1.50	<0.06	0.13-0.15	3.6-5.5	High-----	0.32		
	35-65	5-35	1.60-1.95	<0.06	0.10-0.14	3.6-5.5	Low-----	0.37		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
EnB----- Enon	0-5 5-48 48-65	7-27 35-60 ---	1.25-1.45 1.20-1.40 ---	0.6-2.0 0.06-0.2 ---	0.15-0.20 0.12-0.16 ---	5.1-6.5 5.1-7.8 ---	Low----- High----- ---	0.32 0.28 ---	3	.5-2
EnC----- Enon	0-5 5-25 25-65	7-27 35-60 ---	1.25-1.45 1.20-1.40 ---	0.6-2.0 0.06-0.2 ---	0.15-0.20 0.12-0.16 ---	5.1-6.5 5.1-7.8 ---	Low----- High----- ---	0.32 0.28 ---	3	.5-2
GeB----- Georgeville	0-8 8-62 62-72	12-27 35-65 15-27	1.20-1.40 1.20-1.40 1.20-1.40	0.6-2.0 0.6-2.0 0.6-2.0	0.13-0.18 0.13-0.18 0.05-0.10	4.5-6.0 4.5-5.5 4.5-5.5	Low----- Low----- Low-----	0.49 0.28 0.32	4	<.5
GeC----- Georgeville	0-5 5-35 35-65	12-27 35-65 15-27	1.20-1.40 1.20-1.40 1.20-1.40	0.6-2.0 0.6-2.0 0.6-2.0	0.13-0.18 0.13-0.18 0.05-0.10	4.5-6.0 4.5-5.5 4.5-5.5	Low----- Low----- Low-----	0.49 0.28 0.32	4	<.5
HeB----- Helena	0-12 12-19 19-50 50-72	5-20 20-35 35-60 ---	1.58-1.62 1.46-1.56 1.44-1.55 ---	2.0-6.0 0.2-0.6 0.06-0.2 ---	0.10-0.12 0.13-0.15 0.13-0.15 ---	3.6-6.5 3.6-5.5 3.6-5.5 ---	Low----- Moderate---- High----- ---	0.24 0.28 0.28 ---	4	.5-2
HeC----- Helena	0-11 11-26 26-44 44-65	5-20 20-35 35-60 ---	1.58-1.62 1.46-1.56 1.44-1.55 ---	2.0-6.0 0.2-0.6 0.06-0.2 ---	0.10-0.12 0.13-0.15 0.13-0.15 ---	3.6-6.5 3.6-5.5 3.6-5.5 ---	Low----- Moderate---- High----- ---	0.24 0.28 0.28 ---	4	.5-2
HrB----- Herndon	0-8 8-40 40-65	12-27 35-60 10-27	1.20-1.40 1.30-1.60 1.20-1.40	0.6-2.0 0.6-2.0 0.6-2.0	0.14-0.20 0.13-0.18 0.05-0.08	4.5-6.5 3.6-5.5 3.6-5.5	Low----- Low----- Low-----	0.43 0.28 0.32	5	.5-1
HrC----- Herndon	0-10 10-55 55-65	12-27 35-60 10-27	1.20-1.40 1.30-1.60 1.20-1.40	0.6-2.0 0.6-2.0 0.6-2.0	0.14-0.20 0.13-0.18 0.05-0.08	4.5-6.5 3.6-5.5 3.6-5.5	Low----- Low----- Low-----	0.43 0.28 0.32	5	.5-1
IrB----- Iredell	0-10 10-24 24-53 53-65	7-27 40-60 10-35 ---	1.20-1.40 1.20-1.45 1.30-1.60 ---	0.6-2.0 0.06-0.2 0.06-0.2 ---	0.14-0.17 0.16-0.22 0.14-0.18 ---	5.1-7.3 5.6-7.3 6.1-7.8 ---	Low----- Very high---- Moderate---- ---	0.32 0.20 0.28 ---	3	.5-2
IrC----- Iredell	0-5 5-40 40-49 49-62	12-27 35-60 10-35 ---	1.20-1.40 1.20-1.45 1.30-1.60 ---	0.6-2.0 0.06-0.2 0.06-0.2 ---	0.14-0.17 0.16-0.22 0.14-0.18 ---	5.1-7.3 5.6-7.3 6.1-7.8 ---	Low----- Very high---- Moderate---- ---	0.32 0.20 0.28 ---	3	.5-2
IuC*: Iredell-----	0-10 10-24 24-53 53-65	12-27 40-60 10-35 ---	1.20-1.40 1.20-1.45 1.30-1.60 ---	0.6-2.0 0.06-0.2 0.06-0.2 ---	0.14-0.17 0.16-0.22 0.14-0.18 ---	5.1-7.3 5.6-7.3 6.1-7.8 ---	Low----- Very high---- Moderate---- ---	0.32 0.20 0.28 ---	3	.5-2
Urban land.										
Picture-----	0-7 7-31 31-49 49-62	7-27 30-60 15-30 ---	1.20-1.50 1.20-1.50 1.30-1.60 ---	0.6-2.0 <0.06 0.06-0.2 0.00-20	0.16-0.24 0.12-0.20 0.10-0.18 ---	5.1-7.3 5.6-7.8 5.6-7.8 ---	Low----- Very high---- Moderate---- ---	0.32 0.20 0.28 ---	2	2-5

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
LmB----- Lignum	0-14	12-27	1.20-1.50	0.6-2.0	0.14-0.20	4.5-5.5	Low-----	0.37	4	.5-2
	14-34	35-55	1.25-1.55	<0.06	0.10-0.18	4.5-5.5	Moderate----	0.28		
	34-39	12-27	1.20-1.50	0.2-0.6	0.10-0.18	4.5-5.5	Low-----	0.28		
	39-46	20-40	1.25-1.55	0.2-0.6	0.10-0.18	4.5-5.5	Low-----	0.28		
	46-62	---	---	0.0-0.06	---	---	-----	---		
MaB----- Mayodan	0-9	5-20	1.40-1.65	2.0-6.0	0.11-0.17	4.5-6.0	Low-----	0.24	4	.5-2
	9-28	20-40	1.30-1.40	0.6-2.0	0.12-0.22	4.5-6.0	Low-----	0.32		
	28-44	20-60	1.25-1.55	0.6-2.0	0.12-0.18	4.5-5.5	Moderate----	0.28		
	44-65	---	---	0.2-0.6	---	---	-----	---		
	65-75	---	---	0.0-0.06	---	---	-----	---		
NaB----- Nason	0-12	7-27	1.35-1.45	0.6-2.0	0.14-0.20	4.5-6.5	Low-----	0.24	4	2-5
	12-37	35-53	1.40-1.50	0.6-2.0	0.12-0.19	4.5-5.5	Moderate----	0.32		
	37-42	10-35	1.45-1.55	0.6-2.0	0.15-0.20	4.5-5.5	Low-----	0.24		
	42-50	---	---	0.0-0.06	---	---	-----	---		
NaC----- Nason	0-11	7-27	1.35-1.45	0.6-2.0	0.14-0.20	4.5-6.5	Low-----	0.24	4	2-5
	11-31	35-53	1.40-1.50	0.6-2.0	0.12-0.19	4.5-5.5	Moderate----	0.32		
	31-52	10-35	1.45-1.55	0.6-2.0	0.15-0.20	4.5-5.5	Low-----	0.24		
	52-62	---	---	0.0-0.06	---	---	-----	---		
NaE----- Nason	0-11	7-27	1.35-1.45	0.6-2.0	0.14-0.20	4.5-6.5	Low-----	0.24	4	2-5
	11-40	28-53	1.40-1.50	0.6-2.0	0.12-0.19	4.5-5.5	Moderate----	0.32		
	40-62	---	---	0.0-0.06	---	---	-----	---		
NaF----- Nason	0-5	7-27	1.35-1.45	0.6-2.0	0.14-0.20	4.5-6.5	Low-----	0.24	4	2-5
	5-32	28-53	1.40-1.50	0.6-2.0	0.12-0.19	4.5-5.5	Moderate----	0.32		
	32-40	10-35	1.45-1.55	0.6-2.0	0.15-0.20	4.5-5.5	Low-----	0.24		
	40-62	---	---	0.0-0.06	---	---	-----	---		
PaE----- Pacolet	0-8	8-20	1.00-1.50	2.0-6.0	0.08-0.12	4.5-6.5	Low-----	0.20	3	.5-2
	8-25	35-65	1.30-1.50	0.6-2.0	0.12-0.15	4.5-6.0	Low-----	0.28		
	25-40	15-30	1.20-1.50	0.6-2.0	0.08-0.15	4.5-6.0	Low-----	0.28		
	40-65	10-25	1.20-1.50	0.6-2.0	0.08-0.15	4.5-6.0	Low-----	0.28		
PaF----- Pacolet	0-10	8-20	1.00-1.50	2.0-6.0	0.08-0.12	4.5-6.5	Low-----	0.20	3	.5-2
	10-26	35-65	1.30-1.50	0.6-2.0	0.12-0.15	4.5-6.0	Low-----	0.28		
	26-34	15-30	1.20-1.50	0.6-2.0	0.08-0.15	4.5-6.0	Low-----	0.28		
	34-65	10-25	1.20-1.50	0.6-2.0	0.08-0.15	4.5-6.0	Low-----	0.28		
PcA----- Picture	0-7	7-27	1.20-1.50	0.6-2.0	0.16-0.24	5.1-7.3	Low-----	0.32	2	2-5
	7-31	35-60	1.20-1.50	<0.06	0.12-0.20	5.6-7.8	Very high----	0.20		
	31-49	15-30	1.30-1.60	0.06-0.2	0.10-0.18	5.6-7.8	Moderate----	0.28		
	49-62	---	---	0.00-20	---	---	-----	---		
PnD----- Pinkston	0-6	5-18	1.20-1.40	2.0-6.0	0.10-0.15	4.5-5.5	Low-----	0.20	2	.5-2
	6-24	10-18	1.20-1.50	2.0-6.0	0.06-0.18	4.5-5.5	Low-----	0.24		
	24-32	10-20	1.20-1.50	2.0-6.0	0.05-0.16	4.5-5.5	Low-----	0.24		
	32	---	---	0.2-0.6	---	---	-----	---		
RwD*: Rion-----	0-16	5-20	1.30-1.50	2.0-6.0	0.08-0.12	4.5-6.5	Low-----	0.24	3	.5-2
	16-34	18-35	1.40-1.50	0.6-2.0	0.08-0.15	4.5-6.5	Low-----	0.20		
	34-65	2-25	1.30-1.50	2.0-6.0	0.06-0.12	4.5-6.5	Low-----	0.20		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
RwD*:										
Wateree-----	0-3	5-20	1.40-1.60	2.0-6.0	0.08-0.12	4.5-6.0	Low-----	0.20	3	<1
	3-25	5-18	1.30-1.60	2.0-6.0	0.08-0.12	4.5-6.0	Low-----	0.20		
	25-39	2-15	1.40-1.70	2.0-6.0	0.04-0.12	3.6-6.0	Low-----	0.17		
	39-50	---	---	0.0-0.06	---	---	-----	---		
	50	---	---	0.0-0.06	---	---	-----	---		
Wedowee-----	0-10	5-20	1.25-1.60	2.0-6.0	0.10-0.18	3.6-5.5	Low-----	0.24	3	.5-3
	10-35	35-45	1.30-1.50	0.6-2.0	0.12-0.18	3.6-5.5	Low-----	0.28		
	35-62	15-30	1.20-1.50	0.6-2.0	0.08-0.15	3.6-5.5	Low-----	0.28		
TaE-----	0-5	7-27	1.10-1.40	0.6-2.0	0.16-0.20	4.5-5.5	Low-----	0.37	4	.5-2
Tatum	5-58	35-50	1.40-1.60	0.6-2.0	0.10-0.19	4.5-5.5	Moderate----	0.28		
	58-70	---	---	0.0-0.06	---	---	-----	---		
Ud.										
Udorthents										
UrC*:										
Urban land.										
Iredell-----	0-5	12-27	1.20-1.40	0.6-2.0	0.14-0.17	5.1-7.3	Low-----	0.32	3	.5-2
	5-26	40-60	1.20-1.45	0.06-0.2	0.16-0.22	5.6-7.3	Very high----	0.20		
	26-55	15-40	1.20-1.50	0.06-0.2	0.16-0.22	5.6-7.3	Moderate----	0.20		
	55-65	---	---	---	---	---	-----	---		
Creedmoor-----	0-8	5-20	1.60-1.75	6.0-20	0.05-0.10	3.6-5.5	Low-----	0.20	3	.5-2
	8-12	20-35	1.45-1.65	0.2-0.6	0.13-0.15	3.6-5.5	Moderate----	0.32		
	12-48	35-60	1.30-1.50	<0.06	0.13-0.15	3.6-5.5	High-----	0.32		
	48-68	5-35	1.60-1.95	<0.06	0.10-0.14	3.6-5.5	Low-----	0.37		
VaB-----	0-9	5-20	1.45-1.70	2.0-6.0	0.10-0.14	4.5-6.0	Low-----	0.24	3	.5-2
Vance	9-60	35-60	1.25-1.40	0.06-0.2	0.12-0.15	4.5-5.5	Moderate----	0.28		
	60-80	---	---	---	---	---	-----	---		
VaC-----	0-4	5-20	1.45-1.70	2.0-6.0	0.10-0.14	4.5-6.0	Low-----	0.24	3	.5-2
Vance	4-48	35-60	1.25-1.40	0.06-0.2	0.12-0.15	4.5-5.5	Moderate----	0.28		
	48-62	---	---	---	---	---	-----	---		
WaE*:										
Wateree-----	0-4	5-20	1.40-1.60	2.0-6.0	0.08-0.12	4.5-6.0	Low-----	0.20	3	<1
	4-21	5-18	1.30-1.60	2.0-6.0	0.08-0.12	4.5-6.0	Low-----	0.20		
	21-37	2-15	1.40-1.70	2.0-6.0	0.04-0.12	3.6-6.0	Low-----	0.17		
	37-62	---	---	---	---	---	-----	---		
Rion-----	0-20	5-20	1.30-1.50	2.0-6.0	0.08-0.12	4.5-6.5	Low-----	0.24	3	.5-2
	20-55	18-35	1.40-1.50	0.6-2.0	0.08-0.15	4.5-6.5	Low-----	0.20		
	55-72	2-20	1.30-1.50	2.0-6.0	0.06-0.12	4.5-6.5	Low-----	0.20		
	72-74	---	---	---	---	---	-----	---		
Wedowee-----	0-12	5-20	1.25-1.60	2.0-6.0	0.10-0.18	3.6-5.5	Low-----	0.24	3	.5-3
	12-35	35-45	1.30-1.50	0.6-2.0	0.12-0.18	3.6-5.5	Low-----	0.28		
	35-65	15-30	1.20-1.50	0.6-2.0	0.08-0.15	3.6-5.5	Low-----	0.28		
WeB-----	0-7	5-20	1.25-1.60	2.0-6.0	0.10-0.18	3.6-5.5	Low-----	0.24	3	.5-3
Wedowee	7-23	35-45	1.30-1.50	0.6-2.0	0.12-0.18	3.6-5.5	Low-----	0.28		
	23-65	15-30	1.20-1.50	0.6-2.0	0.08-0.15	3.6-5.5	Low-----	0.28		
WeC-----	0-12	5-20	1.25-1.60	2.0-6.0	0.10-0.18	3.6-5.5	Low-----	0.24	3	.5-3
Wedowee	12-20	35-45	1.30-1.50	0.6-2.0	0.12-0.18	3.6-5.5	Low-----	0.28		
	20-65	15-30	1.20-1.50	0.6-2.0	0.08-0.15	3.6-5.5	Low-----	0.28		

\* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					<u>Ft</u>			<u>In</u>			
AaA----- Altavista	C	Rare-----	---	---	1.5-2.5	Apparent	Dec-Apr	>60	---	Moderate	Moderate.
ApB, ApC----- Appling	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
AuC*: Appling----- Urban land.	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
CaB, CeB2, CeC2--- Cecil	B	None-----	---	---	>6.0	---	---	>60	---	High-----	High.
ChA*: Chewacla----- Wehadkee-----	C	Frequent-----	Brief to long.	Nov-Apr	0.5-1.5	Apparent	Nov-Apr	>60	---	High-----	Moderate.
	D	Frequent-----	Brief to long.	Nov-Jun	0-1.0	Apparent	Nov-May	>60	---	High-----	Moderate.
CoA----- Congaree	B	Frequent-----	Brief-----	Nov-Apr	2.5-4.0	Apparent	Nov-Apr	>60	---	Moderate	Moderate.
CrB, CrC----- Creedmoor	C	None-----	---	---	1.5-2.0	Perched	Jan-Mar	>60	---	High-----	High.
EnB, EnC----- Enon	C	None-----	---	---	>6.0	---	---	>60	---	High-----	Moderate.
GeB, GeC----- Georgeville	B	None-----	---	---	>6.0	---	---	>60	---	High-----	High.
HeB, HeC----- Helena	C	None-----	---	---	1.5-2.5	Perched	Jan-Apr	>60	---	High-----	High.
HrB, HrC----- Herndon	B	None-----	---	---	>6.0	---	---	>60	---	High-----	High.
IrB, IrC----- Iredell	C/D	None-----	---	---	1.0-2.0	Perched	Dec-Apr	40-60 >60	Soft Hard	High-----	Low.
IuC*: Iredell----- Urban land.	C/D	None-----	---	---	1.0-2.0	Perched	Dec-Apr	40-60 >60	Soft Hard	High-----	Low.
Picture-----	D	None-----	---	---	0.5-1.5	Perched	Nov-Apr	40-60 >60	Soft Hard	High-----	Moderate.
ImB----- Lignum	C	None-----	---	---	1.0-2.5	Perched	Dec-May	40-60 >60	Soft Hard	High-----	High.
MaB----- Mayodan	B	None-----	---	---	>6.0	---	---	>60	---	High-----	Moderate.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth Ft	Kind	Months	Depth In	Hard-ness	Uncoated steel	Concrete
NaB, NaC, NaE, NaF----- Nason	B	None-----	---	---	>6.0	---	---	40-60 >60	Soft Hard	Moderate	High.
PaE, PaF----- Pacolet	B	None-----	---	---	>6.0	---	---	>60	---	High-----	High.
PcA----- Picture	D	None-----	---	---	0.5-1.5	Perched	Nov-Apr	40-60 >60	Soft Hard	High-----	Moderate.
PnD----- Pinkston	B	None-----	---	---	>6.0	---	---	20-40	Hard	Low-----	High.
RwD*: Rion-----	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	High.
Wateree-----	B	None-----	---	---	>6.0	---	---	20-40 >60	Soft Hard	Low-----	High.
Wedowee-----	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	High.
TaE----- Tatum	B	None-----	---	---	>6.0	---	---	40-60 >60	Soft Hard	High-----	High.
Ud. Udorthents											
UrC*: Urban land.											
Iredell-----	C/D	None-----	---	---	1.0-2.0	Perched	Dec-Apr	40-60 >60	Soft Hard	High-----	Low.
Creedmoor-----	C	None-----	---	---	1.5-2.0	Perched	Jan-Mar	>60	---	High-----	High.
VaB, VaC----- Vance	C	None-----	---	---	>6.0	---	---	>60	---	High-----	High.
WaE*: Wateree-----	B	None-----	---	---	>6.0	---	---	20-40 >40	Soft Hard	Low-----	High.
Rion-----	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	High.
Wedowee-----	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	High.
WeB, WeC----- Wedowee	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	High.

\* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL ANALYSIS OF SELECTED SOILS

(A dash indicates that the material was not detected. TR indicates trace amounts of element. A blank indicates that a determination was not made. The pedons for the soils listed are typical of the series in the survey area. For the location of the pedons, see the section "Soil Series and Their Morphology")

Soil name, sample number, horizon, and depth in inches	Total			Size class and particle diameter (mm)							Tex- tural class	Coarse fragments			
	Sand (2- 0.05 mm)	Silt (0.05- 0.002 mm)	Clay (<0.002 mm)	Sand					Sand coarser than very fine (2-0.1)	Very fine sand plus silt (0.1- 0.002)			>2 mm	2-20 mm	20-75 mm
				Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5- 0.25)	Fine (0.25- 0.1)	Very fine (0.1- 0.05)							
-----Pct <2 mm-----															
Creedmoor coarse sandy loam: (S88NC-077-003)													Pct	Pct	Pct
Ap----- 0 to 7	70.1	18.6	11.3	14.3	17.7	16.2	13.5	8.4	61.7		27.0	cosl	7	7	---
Bt1----- 7 to 18	17.9	22.3	59.8	2.3	4.4	4.0	4.2	3.0	14.9		25.3	c	TR	TR	---
Bt2-----18 to 26	23.5	30.3	46.2	2.2	5.0	5.5	5.9	4.9	24.5		35.2	c	TR	TR	---
Bt2-----26 to 36	6.8	37.0	56.2	0.1	0.5	0.6	1.4	4.2	6.8		41.2	c	---	---	---
Bt3-----36 to 52	5.5	46.0	48.5	---	0.2	0.2	1.0	4.1	5.5		50.1	sic	1	1	---
BCg-----52 to 68	7.5	49.9	42.7	---	0.7	0.7	1.7	4.5	7.5		54.3	sic	---	---	---
Cg-----68 to 83	20.0	53.1	26.9	0.4	3.2	3.2	5.6	8.5	20.0		61.6	sil	---	---	---
Picture loam: (S86NC-077-001)															
A----- 0 to 3	35.7	47.7	16.6	3.1	5.7	9.2	8.3	9.4	26.3		57.1	l	2	2	---
AB----- 3 to 7	40.9	45.0	14.1	6.1	9.3	8.8	6.6	10.1	30.8		55.1	l	5	5	---
Btg1----- 7 to 17	34.6	34.4	31.0	7.7	7.6	6.8	6.2	6.3	28.3		40.7	cl	4	4	---
Btg2-----17 to 24	25.3	24.0	50.7	5.2	4.8	4.5	5.3	5.5	19.8		29.5	c	4	4	---
BCg-----24 to 31	34.4	24.7	40.9	6.7	4.4	3.8	9.3	10.2	24.2		34.9	c	32	32	---
Cg-----31 to 49	66.0	17.8	16.2	13.2	10.9	10.8	15.8	15.3	50.7		33.1	sl	21	21	---
Cr-----49 to 59															



TABLE 17.--CHEMICAL ANALYSIS OF SELECTED SOILS

(A dash indicates that the material was not detected. TR indicates trace amounts of element. A blank indicates that a determination was not made. The pedons for the soils listed are typical of the series in the survey area. For the location of the pedons, see the section "Soil Series and Their Morphology")

Soil name, sample number, horizon, and depth in inches	pH		Extractable cations						Cation-exchange capacity		Extract- able acidity	Extract- able aluminum	Base saturation		Organic carbon	Calcium carbonate equivalent
	H <sub>2</sub> O	KCl 1N	Ca	Mg	Na	K	Sum of bases	Ammonium acetate	Sum of cations	Sum of cations			Ammonium acetate			
	1:1	1:1														
			-----Milliequivalents per 100 grams of soil-----										Pct	Pct	Pct	Pct
Creedmoor coarse sandy loam: (S88NC-077-003)																
Ap----- 0 to 7	5.7	4.4	1.6	0.6	0.1	0.1	2.4	3.4	4.8	2.4		50	71	0.38		
Bt1----- 7 to 18	4.3	3.2	3.7	1.3	0.2	0.3	5.5	25.0	26.4	20.9	13.6	21	22	0.22		
Bt2-----18 to 26	4.3	3.3	2.7	1.0	0.2	0.3	4.2	21.5	23.4	19.2	13.0	18	20	0.16		
Bt2-----26 to 36	4.1	3.2	1.8	0.9	0.1	0.4	3.2	22.4	31.1	27.9	15.9	10	14	0.10		
Bt3-----36 to 52	4.3	3.2	1.1	0.8	0.1	0.4	2.4	23.2	26.5	24.1	16.9	9	10	0.07		
BCg-----52 to 68	4.6	3.2	0.8	0.6	0.1	0.3	1.8	19.9	21.8	20.0	14.5	8	9	0.07		
Cg-----68 to 83	4.4	3.3	0.7	0.7	0.1	0.3	1.8	15.8	17.9	16.1	12.2	10	11	0.07		
Picture loam: (S86NC-077-001)																
A----- 0 to 3	4.9	4.4	11.6	4.4	0.1	0.1	16.2	22.1	28.4	12.2	0.2	57	73	4.03		
AB----- 3 to 7	5.2	4.5	6.7	3.7	0.1	0.1	10.6	16.9	19.4	8.8	0.2	55	63	2.08		
Btg1----- 7 to 17	5.9	4.6	14.1	8.3	0.2	TR	22.6	24.7	29.6	7.0		76	91	1.00		
Btg2-----17 to 24	6.3	5.1	24.2	17.8	0.7	0.1	42.8	38.6	48.7	5.9		88	100	0.66	TR	
BCg-----24 to 31	7.3	6.3	30.5	26.3	1.2	0.1	58.1	41.8	59.8	1.7		97	100	0.36	TR	
Cg-----31 to 49	7.5	6.4	16.5	16.5	0.8	TR	31.5	23.6	32.9	1.4		96	100	0.16	TR	
Cr-----49 to 59																

TABLE 18.--CLAY MINERALOGY OF SELECTED SOILS

(A dash indicates that the mineral was not detected. The pedons for the soils listed are typical of the series in the survey area. For the location of the pedons, see the section "Soil Series and Their Morphology")

Soil name, sample number, horizon, and depth in inches	Relative amounts* <0.002 mm						
	Kaolin- ite	Vermicu- lite	Mica	Mont- moril- lonite	Geothite	Hema- tite	Talc
Creedmoor coarse sandy loam: (S88NC-077-003)							
Bt2-----18 to 26	4	2	2	---	2	---	---
Bt2-----26 to 36	4	2	2	---	3	1	---
Cg-----68 to 83	3	2	2	---	2	---	---
Picture loam: (S86NC-077-001)							
Btg1-----7 to 17	3	2	1	3	---	---	2
Cg-----31 to 49	3	2	---	3	---	---	2

\* Relative amounts: 5 dominant; 4 abundant; 3 moderate; 2 small; 1 trace.

TABLE 19.--ENGINEERING INDEX TEST DATA

(Dashes indicate that data were not available. The pedon for the soil listed is typical of the series in the survey area. For the location of the pedon, see the section "Soil Series and Their Morphology")

Soil name, sample number, horizon, and depth in inches	Classification		Grain-size distribution							Liquid limit	Plas- ticity index	Moisture density	
			Percentage passing sieve--				Percentage smaller than--					Maximum dry	Optimum moisture
	Unified	AASHTO	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm			density	
										Pct		Lb/ cu ft	Pct
Picture loam: (S86NC-077-001)													
A----- 0 to 3	ML	A-7-5(12)	100	99	87	69	56	26	17	48	17	89	25
AB----- 3 to 7	CL	A-4(6)		100	84	64	44	21	13	32	10	109	17
Btg1----- 7 to 17	CH	A-7-6(18)	100	97	82	69	57	43	36	63	37	99	23
Btg2-----17 to 24	CH	A-7-5(20)	100	96	87	76	70	57	51	82	52	95	26
BCg-----24 to 31	CH	A-7-6(16)	100	90	76	60	49	38	34	82	55	97	22
Cg-----31 to 49	SC	A-2-7(3)	100	86	63	34	21	15	12	44	24	---	---

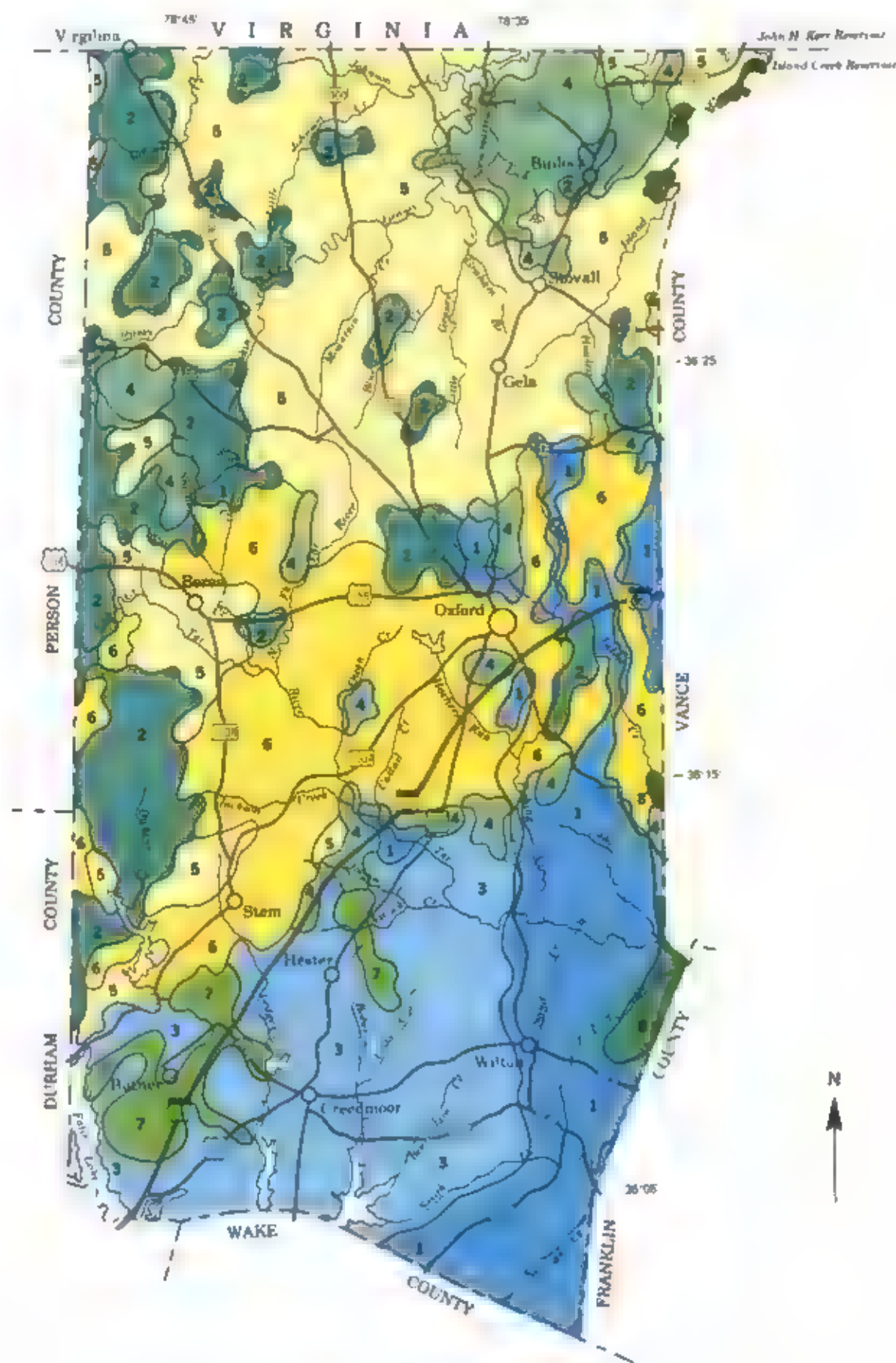
TABLE 20.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Altavista-----	Fine-loamy, mixed, thermic Aquic Hapludults
Appling-----	Clayey, kaolinitic, thermic Typic Kanhapludults
Cecil-----	Clayey, kaolinitic, thermic Typic Kanhapludults
Chewacla-----	Fine-loamy, mixed, thermic Fluvaquentic Dystrochrepts
Congaree-----	Fine-loamy, mixed, nonacid, thermic Typic Udifluvents
Creedmoor-----	Clayey, mixed, thermic Aquic Hapludults
Enon-----	Fine, mixed, thermic Ultic Hapludalfs
Georgeville-----	Clayey, kaolinitic, thermic Typic Hapludults
Helena-----	Clayey, mixed, thermic Aquic Hapludults
Herndon-----	Clayey, kaolinitic, thermic Typic Hapludults
Iredell-----	Fine, montmorillonitic, thermic Typic Hapludalfs
Lignum-----	Clayey, mixed, thermic Aquic Hapludults
Mayodan-----	Clayey, mixed, thermic Typic Hapludults
Nason-----	Clayey, mixed, thermic Typic Hapludults
Pacolet-----	Clayey, kaolinitic, thermic Typic Kanhapludults
Picture-----	Fine, montmorillonitic, thermic Vertic Argiaquolls
Pinkston-----	Coarse-loamy, mixed, thermic Ruptic-Ultic Dystrochrepts
Rion-----	Fine-loamy, mixed, thermic Typic Hapludults
Tatum-----	Clayey, mixed, thermic Typic Hapludults
Udorthents-----	Udorthents
Vance-----	Clayey, mixed, thermic Typic Hapludults
Wateree-----	Coarse-loamy, mixed, thermic Typic Dystrochrepts
Wedowee-----	Clayey, kaolinitic, thermic Typic Kanhapludults
Wehadkee-----	Fine-loamy, mixed, nonacid, thermic Typic Fluvaquents

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### SOIL LEGEND\*

- CECIL
- NASON-HERNDON-LIGNUM
- CREEDMOOR
- IREDELE ENON-GEORGEVILLE
- GEORGEVILLE-HERNDON
- VANCE-HELENA
- IREDELE-PICTURE-ENON
- WEDOWEE-RION-WATERREE

\*The units on this legend are described in the text under the heading "General Soil Map Units."

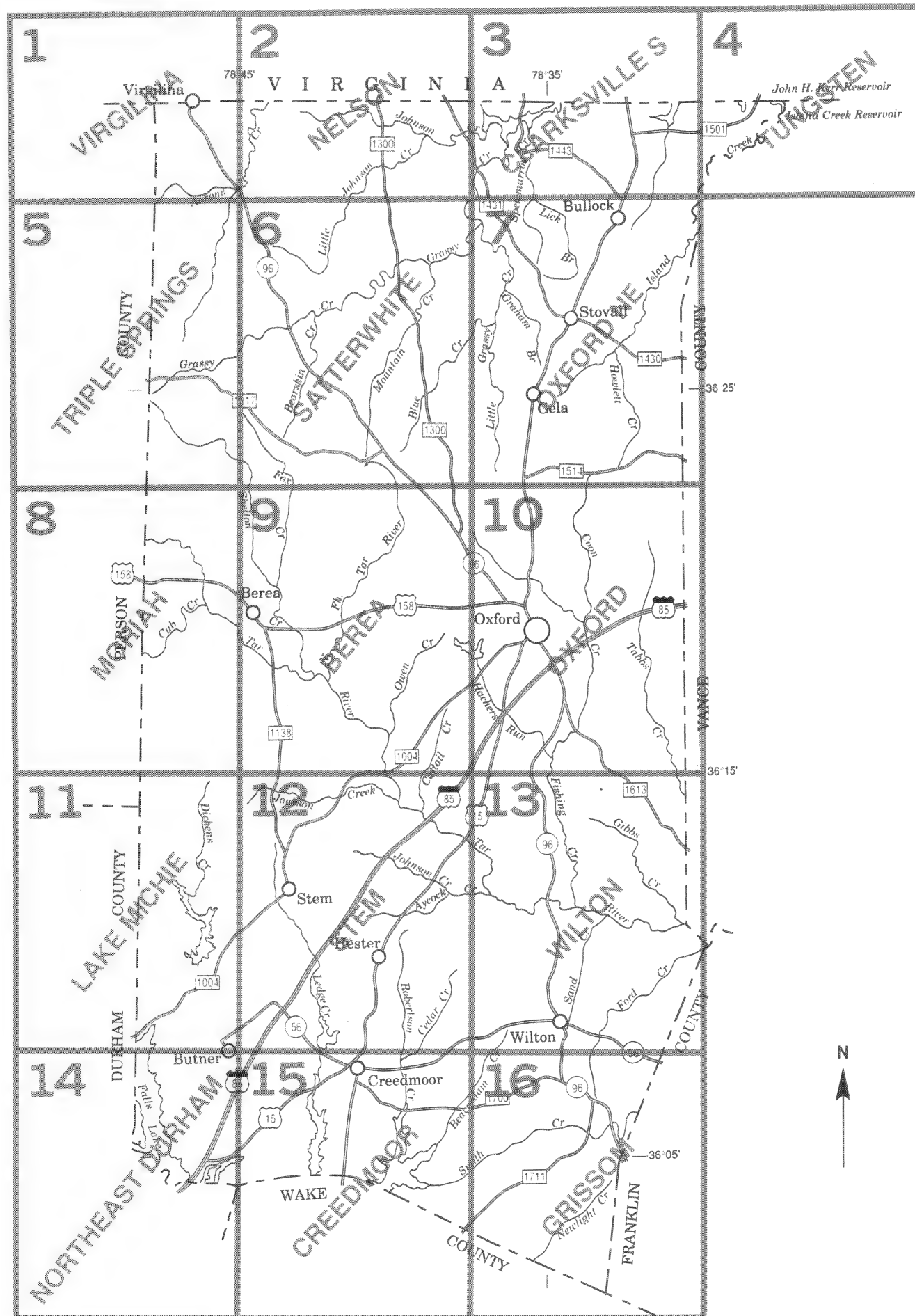
Compiled 1993

UNITED STATES DEPARTMENT OF AGRICULTURE  
NATURAL RESOURCES CONSERVATION SERVICE  
NORTH CAROLINA DEPARTMENT OF ENVIRONMENT HEALTH AND NATURAL RESOURCES  
NORTH CAROLINA AGRICULTURAL RESEARCH SERVICE  
NORTH CAROLINA COOPERATIVE EXTENSION SERVICE  
GRANVILLE SOIL AND WATER CONSERVATION DISTRICT  
GRANVILLE COUNTY BOARD OF COMMISSIONERS

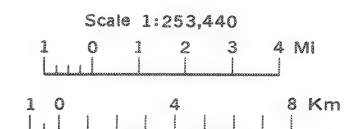
### GENERAL SOIL MAP

GRANVILLE COUNTY, NORTH CAROLINA





INDEX TO MAP SHEETS  
GRANVILLE COUNTY, NORTH CAROLINA





SOIL LEGEND

Map symbols and names are alphabetical. Map symbols are letters or a combination of letters and numbers. The first letter is capitalized and is the first letter of the series (or higher level of classification) name. The second letter is lowercase. The third letter, where used, is capitalized and denotes the slope phase. The number 2, if used, is at the end of several map unit symbols and denotes a moderately eroded phase.

SYMBOL	NAME
AaA	Altavista loam, 0 to 3 percent slopes, rarely flooded
ApB	Appling sandy loam, 2 to 6 percent slopes
ApC	Appling sandy loam, 6 to 10 percent slopes
AuC	Appling-Urban land complex, 2 to 10 percent slopes
CaB	Cecil sandy loam, 2 to 6 percent slopes
CeB2	Cecil clay loam, 2 to 6 percent slopes, eroded
CeC2	Cecil clay loam, 6 to 10 percent slopes, eroded
ChA	Chewacla and Wehadkee soils, 0 to 2 percent slopes, frequently flooded
CoA	Congaree silt loam, 0 to 2 percent slopes, frequently flooded
CrB	Creedmoor coarse sandy loam, 2 to 6 percent slopes
CrC	Creedmoor coarse sandy loam, 6 to 10 percent slopes
EnB	Enon loam, 2 to 6 percent slopes
EnC	Enon loam, 6 to 10 percent slopes
GeB	Georgeville silt loam, 2 to 6 percent slopes
GeC	Georgeville silt loam, 6 to 10 percent slopes
HeB	Helena sandy loam, 2 to 6 percent slopes
HeC	Helena sandy loam, 6 to 10 percent slopes
HrB	Herndon silt loam, 2 to 6 percent slopes
HrC	Herndon silt loam, 6 to 10 percent slopes
IrB	Iredell loam, 2 to 6 percent slopes
IrC	Iredell loam, 6 to 10 percent slopes
IuC	Iredell-Urban land-Picture complex, 0 to 10 percent slopes
LmB	Lignum silt loam, 2 to 6 percent slopes
MaB	Mayodan sandy loam, 2 to 6 percent slopes
NaB	Nason gravelly loam, 2 to 6 percent slopes
NaC	Nason gravelly loam, 6 to 10 percent slopes
NaE	Nason gravelly loam, 10 to 25 percent slopes
NaF	Nason gravelly loam, 25 to 50 percent slopes
PaE	Pacolet sandy loam, 10 to 25 percent slopes
PaF	Pacolet sandy loam, 25 to 50 percent slopes
PcA	Picture loam, 0 to 3 percent slopes
PnD	Pinkston loamy sand, 10 to 20 percent slopes
RwD	Rion-Wataree-Wedowee complex, 8 to 15 percent slopes
TaE	Tatum loam, 10 to 25 percent slopes
Ud	Udorthents, loamy
UrC	Urban land-Iredell-Creedmoor complex, 2 to 10 percent slopes
VaB	Vance sandy loam, 2 to 6 percent slopes
VaC	Vance sandy loam, 6 to 10 percent slopes
WaE	Wataree-Rion-Wedowee complex, 15 to 30 percent slopes
WeB	Wedowee sandy loam, 2 to 6 percent slopes
WeC	Wedowee sandy loam, 6 to 10 percent slopes

CONVENTIONAL AND SPECIAL  
SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES	
National, state, or province	-----
County or parish	-----
Minor civil division	-----
Reservation (national forest or park, state forest or park, and large airport)	-----
Land grant	-----
Limit of soil survey (label)	-----
Field sheet matchline and nestline	-----
AD HOC BOUNDARY (label)	-----
Small airport, airfield, park, oilfield, cemetery, or flood pool	-----
STATE COORDINATE TICK 1 890 000 FEET	-----
LAND DIVISION CORNER (sections and land grants)	-----
ROADS	
Divided (median shown if scale permits)	=====
Other roads	-----
Trail	-----
ROAD EMBLEM & DESIGNATIONS	
Interstate	-----
Federal	-----
State	-----
County, farm or ranch	-----
RAILROAD	-----
POWER TRANSMISSION LINE (normally not shown)	-----
PIPE LINE (normally not shown)	-----
FENCE (normally not shown)	-----
LEVEES	
Without road	-----
With road	-----
With railroad	-----
DAMS	
Large (to scale)	-----
Medium or Small (Named where applicable)	-----
PITS	
Gravel pit	-----
Mine or quarry	-----

MISCELLANEOUS CULTURAL FEATURES

Farmstead, house (omit in urban area) (occupied)	-----
Church	-----
School	-----
Indian mound (label)	-----
Located object (label)	-----
Tank (label)	-----
Wells, oil or gas	-----
Windmill	-----
Kitchen midden	-----

WATER FEATURES

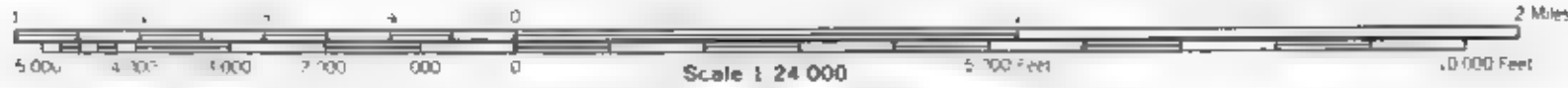
DRAINAGE	
Perennial, double line	=====
Perennial, single line	=====
Intermittent	-----
Drainage end	-----
Canals or ditches	-----
Double-line (label)	=====
Drainage and/or irrigation	-----
LAKES, PONDS AND RESERVOIRS	
Perennial	-----
Intermittent	-----
MISCELLANEOUS WATER FEATURES	
Marsh or swamp	-----
Spring	-----
Well, artesian	-----
Well, irrigation	-----
Wet spot	-----

SPECIAL SYMBOLS FOR  
SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS	HeC	WeB
ESCARPMENTS		
Bedrock (points down slope)	-----	-----
Other than bedrock (points down slope)	-----	-----
SHORT STEEP SLOPE	-----	-----
GULLY	-----	-----
DEPRESSION OR SINK	-----	-----
SOIL SAMPLE (normally not shown)	-----	-----
MISCELLANEOUS		
Blowout	-----	-----
Clay spot	-----	-----
Gravelly spot	-----	-----
Gumbo, slick or scabby spot (sodic)	-----	-----
Dumps and other similar non soil areas	-----	-----
Prominent hill or peak	-----	-----
Rock outcrop (includes sandstone and shale)	-----	-----
Saline spot	-----	-----
Sandy spot	-----	-----
Severely eroded spot	-----	-----
Slide or slip (tips point upslope)	-----	-----
Stony spot, very stony spot	-----	-----



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GRANVILLE COUNTY, NORTH CAROLINA NO. 1



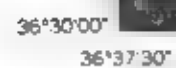


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GRANVILLE COUNTY, NORTH CAROLINA NO. 2





GRANVILLE COUNTY NORTH CAROLINA NO 3





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GRANVILLE COUNTY, NORTH CAROLINA NO. 4

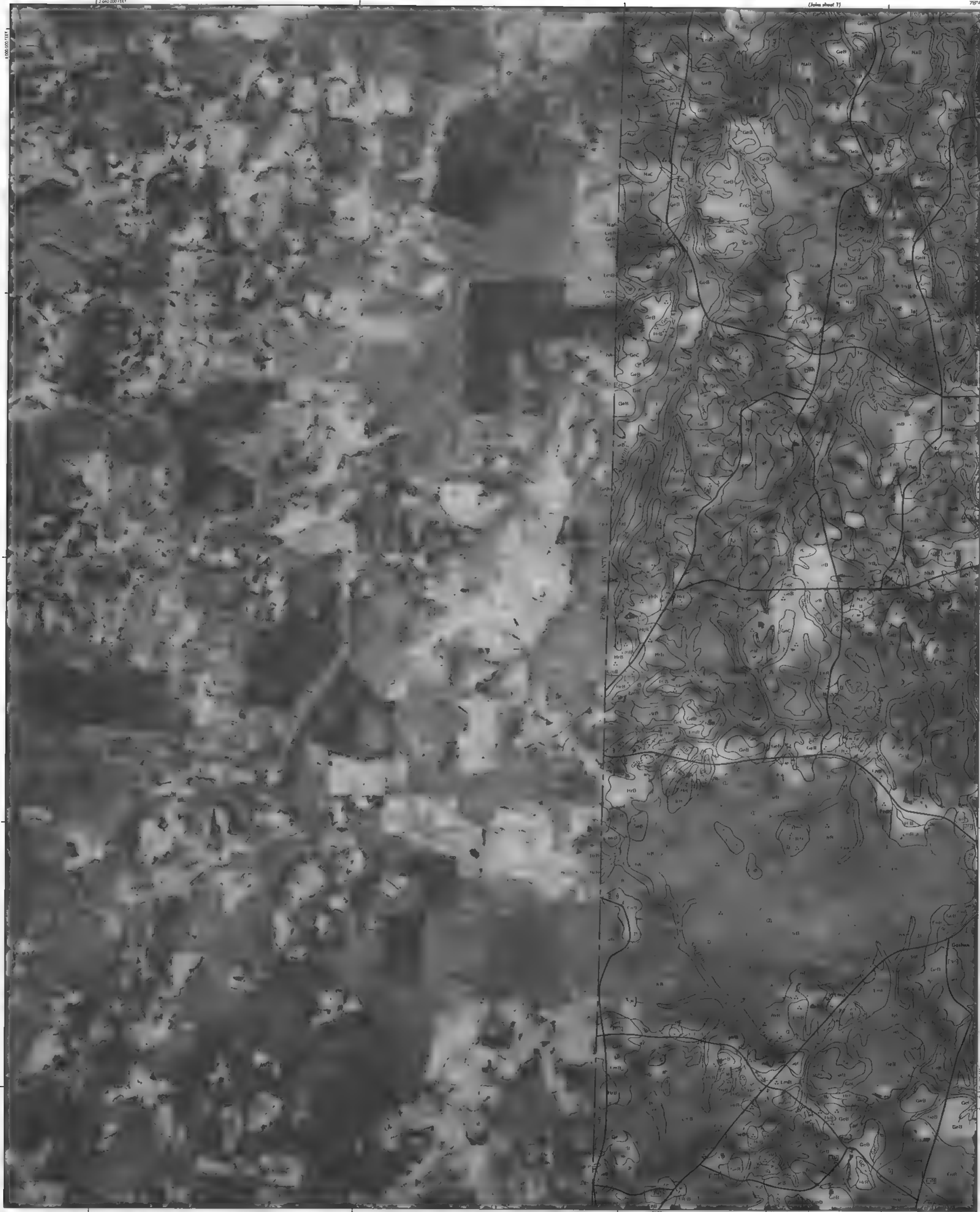




(Johns Street 1)

78°45'00"

36°30'00"



36°22'30"

78°52'30"

Johns Street 1

Johns Street 1

Johns Street 1

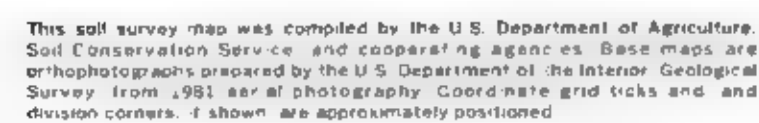
Johns Street 1

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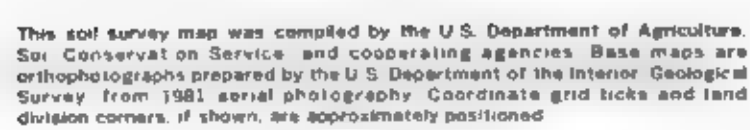


GRANVILLE COUNTY, NORTH CAROLINA NO. 5













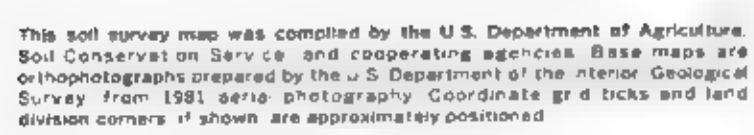
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GRANVILLE COUNTY, NORTH CAROLINA NO. 8











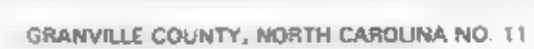
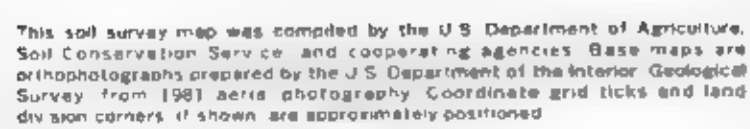
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GRANVILLE COUNTY, NORTH CAROLINA NO. 10











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GRANVILLE COUNTY, NORTH CAROLINA NO. 12







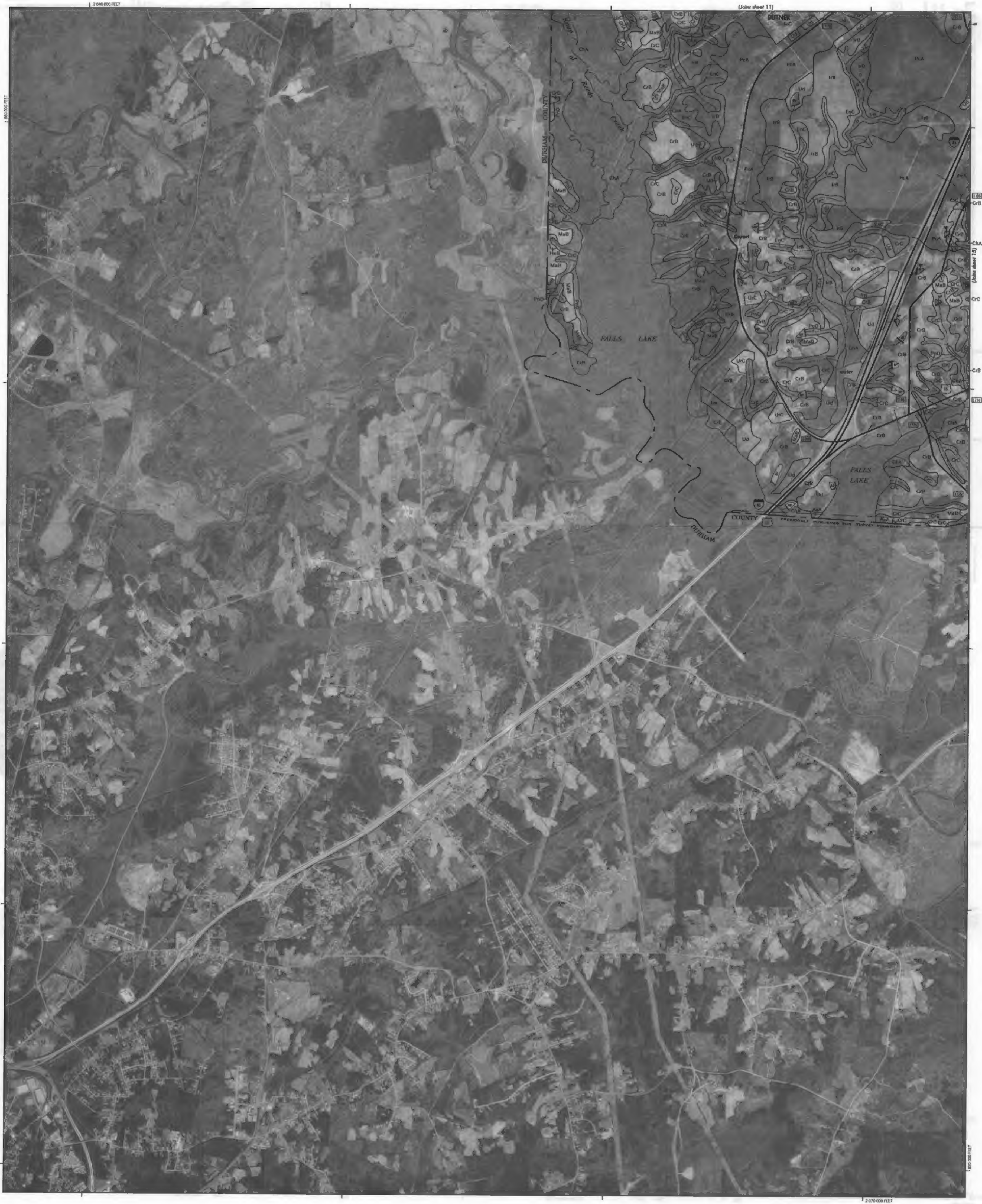
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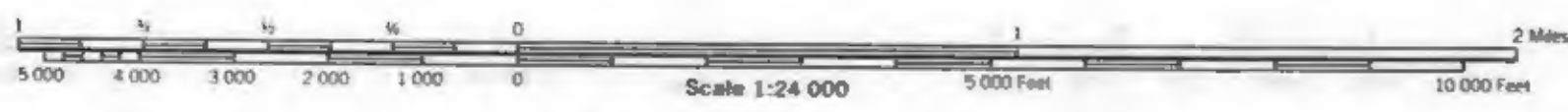
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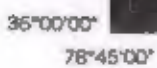


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GRANVILLE COUNTY, NORTH CAROLINA NO. 14





GRANVILLE COUNTY, NORTH CAROLINA NO. 15





